DACA41-02-R-0012

US Army Corps of Engineers
Kansas City District
You Matter - We Care

Command and General Staff College

Fort Leavenworth, Kansas

35 % Design Analysis

November 2002

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PART 1 - GENERAL DESCRIPTION

This project will construct a new Command and General Staff College (CGSC) at Fort Leavenworth Kansas. Included in this project is the demolition of the existing Bell Hall facility including the Harold K. Johnson (HKJ) wing and the relocation of valued pieces of stained glass panels from Bell Hall to the new facility.

PROJECT HISTORY

In January of 2000 phase one of a two phase advanced planning charrette was conducted to consider such areas as site selection, number of buildings, building massing, footprint and finishes for the new Command and General Staff College (CGSC). This effort was in preparation for the CGSC's presentation to the Pentagon in mid summer 2000.

In February 2000 phase two of the advanced planning charrette was held to further develop, refine and build on the results that came from that original phase one charrette.

February 2002. A final Value based design charrette was conducted to begin the final planning of the new Command and General Staff College. The charrette achieved five goals:

- A consensus among the stakeholders for the acceptance of a design concept.
- A design concept estimated within budget.
- A workable site plan and building design on a very difficult site.
- A workable building plan that accommodates a changing program while still maintaining scope and budget.
- A building with a reasonable efficiency of space.

June 2002. A meeting was held at the Frontier Conference Center to discuss site issues and water shed. General discussion was why the building is sited at its present location. Site issues of greatest concern were; Existing soil stability, Impacts down stream, and Building location and construction methods. Three viable alternatives for the dam were proposed and discussed.

- Replace the dam at its present location upstream face of the building.
- Construct a dam along the down stream face or the designed building fill.
- Construct an independent dam downstream of the project so that the fill on which the building is built will have no dam function.

Preliminary evaluations suggest that Alternate 3 would be more constructable, have fewer hazards, and be less expensive.

1.1 DIRECTIVE AUTHORIZATION (FROM ORIGINAL 1391)

Installation:	Fort Leavenworth, Kansas
Fiscal Year:	FY2004
Project Name:	Command and General Staff College
Project Number:	PN 51174
Scope:	300,000 Square Feet
Programmed Amount:	$89,000,000

1.2 APPLICABLE CRITERIA

Refer to Individual Disciplines for Applicable Criteria

1.3 PURPOSE AND FUNCTION AND MISSION

1.3.1 General

The mission of this new facility is to educate leaders in the values and practice of the profession of arms, to act as the executive agent for the Army's Leader Development Program, to develop doctrines that guide the Army and to promote and support the advancement of military arts and sciences into the 21st century. The CGSC is also responsible for integrating and improving current and future battle command and control systems as well as the development of the Officer Professional Management systems for the next century.

The new Command and General Staff College will provide this capability by providing the military student with state of the art classrooms which are modeled on the current TRADOC Classroom XXI environment and the Army After Next initiatives. In support of these classrooms the facility will include a language laboratory and presentation room, administration and faculty offices, CGSC main conference room, auditorium and lecture rooms, computer lab and computer area, a secure compartmented information facility (SCIF), CGSC sister services offices, support services which include book store, barber/beauty shop and cafeteria. Community support spaces including a trophy room, general officers prep rooms. A prayer room will be provided in CARL Library directly adjacent to the new building link.

1.4 SPIRIT

The Army Command and General Staff College (CGSC) programmatic requirement is to achieve a SPiRiT rating of bronze. SPiRiT v 1.4 is based on LEED 2.0 Green Building Rating System TM and is used with full legal agreement between the Corps and the USGBC. The SPiRiT system is comprised of seven (7) fully integrated divisions in order to create a holistically designed facility. The strategies employed for the CGSC for each of these divisions are as follows:

1.4.1 Sustainable Sites

The CGSC is sited to avoid a natural riparian area and partially built upon an abandoned landfill and sewage treatment plant. Parking is to be minimal and will utilize an existing parking lot. The Post provides for shuttle transport, bike lockup and the new facility will incorporate shower/locker rooms. Specifications for storm water management will be employed.

1.4.2 Water Efficiency

The facility is not intending to use an irrigation system and will use water saving fixtures.

1.4.3 Energy and Atmosphere

The CGSC will employ building commissioning and either water source or other geothermal heat pump mechanical systems to reduce energy use by approximately 10-20%.

1.4.4 Materials and Resources

The post has a recycling collection system and the new facility will integrate into the process. Materials will use recycled content, rapidly renewable materials and local/regional materials. The vast amount of historic memorabilia will be relocated to the new facility and the stained glass displays will be incorporated into the new fenestration systems. Specifications for construction waste management will be employed.

1.4.5 Indoor Environmental Quality

The CGSC will meet ASHRAE standards, smoking will not be allowed in the facility. Selected materials will have little or no VOC off gassing, minimize chemical and pollutant sources, meet thermal comfort and ventilation standards, provide for acoustic separation and noise control and take full advantage of daylight and views to reduce lighting loads.

1.4.6 Facility Delivery Process

The CGSC was designed using a holistic delivery method with an interdisciplinary team participating in the design charette, and providing for mini-workshops in sustainable design.

1.4.7 SPiRiT Report and Executive Summary

Refer to Appendix A.

1.5 WAIVERS

No waivers will be required for this project.

1.6 SECURITY PROVISIONS

All spaces, systems and site features of this new facility will be designed to meet the Department of Defense Antiterrorism Standards for Buildings UFC 4-010-10 (latest Draft) and DCID 1/21 Manual for Physical Security for Sensitive Compartmented Information Facilities (SCIF) 30 January 1994.

PART 2 - CIVIL

2.1 SITE GRADING

The proposed Lewis & Clark Center building will be connected to the south side of the C.A.R.L. facility. It will extend to the southwest along the face of the dam approximately to the existing Stimson Avenue. The ground floor of the building will be at elevation 247.6.

To provide the necessary fill material, the high areas where the Berlin Wall Monument is located will be excavated approximately 5.5 meters to 251.5. The excavated material will be placed under the Lewis & Clark Center to a fill of elevation 247.5. This will require approximately 3.5 m of fill above the existing Smith Lake dam. The estimated fill required will be 68,000 c.m. The fill will extend southward from the C.A.R.L. dock area to the general area of the creek. A new dam will be constructed at the location where the sanitary sewer and water main cross the dam, approximately 90 meters downstream of the southeast face of the new building. The south end of the building will be graded so that the second floor will be 0.5 foot above the finished grade along the south wall. The area under the building will be over-excavated and an estimated 2.4 m of material will be removed and replaced. Since much of the site has historically been a demolition landfill, we have assumed that up to 17,600 c.m. will be disposed of other than under the building site. A retaining wall is anticipated south of the C.A.R.L. between the new facility and the Wint Avenue housing.

Access to the loading dock of the Lewis & Clark Center will be from south of the C.A.R.L. using the current dock access at the intersection of Wint and Gibbon Avenues. The main entrance to the center will be at the south end facing Stimson Avenue. The entrance facing Stimson Avenue will be a ceremonial entrance. A 10-car parking lot will be constructed to the west of the ceremonial entrance. The existing parking lot north of Truesdale Hall will be extended to the east and south to compensate for removal of the existing parking lot east of Truesdale Hall. This parking lot will be removed to accommodate the new 10-car lot and meet force protection guidelines. A second truck entrance will be constructed from Stimson Avenue to the loading dock at the back of the Auditorium. This access road will be designed for semi-trailer truck access and will incorporate a 40-car parking lot with handicapped parking facilities.

There will be sidewalk access from the Lewis & Clark Center to the Overflow Parking Lot, to Grand Avenue and north to the Eisenhower complex.

2.2 4TH STREET EXTENSION

A four lane curb and guttered collector level street will be constructed from the 4th Street Extension recently constructed at the National Guard Facility near Metropolitan Avenue (Highway 92) extending approximately 1,620 m northward to the intersection of Wint Avenue and Stimson Avenue southeast of Bell Hall. The road will generally follow the old river road northerly to the Warehouse 341 drive, then along the Bundle Road alignment northerly to the Overflow Parking south entrance and then northerly to align with Stimson Avenue east of Bell Hall. The roadway will be 4-3.6 m driving lanes and curb and gutter on each side. However, at this time, the roadway will be constructed for 2-3.6 m driving lanes, turning lanes and no curb and gutter or rapid draining

pavement. An access control checkpoint, with areas for inspection, areas for traffic control, and a information building with parking areas and utilities will be designed according to AT/FP construction standards and the designs provided by Ft. Leavenworth. This facility will be located north of the National Guard Facility.

2.3 STIMSON AVENUE REALIGNMENT

Stimson Avenue will be realigned beginning in front of Truesdale Hall and running southeasterly, (staying to the northeast of the existing conifer trees,) to align with Bundel Road at the northeast corner of the Overflow Parking Lot. The realigned Stimson Road will intersect Stillwell Avenue north of the overflow parking lot. This will be an 8.48 m back-to-back curb and guttered two-lane roadway with a 1.8 m sidewalk on one side and no shoulders. A storm drainage collection system will be constructed as required on the roadway. A 500 mm high force protection wall is placed adjacent to the sidewalk between the ceremonial drive entrance and the entrance to the 40 car parking lot.

2.4 SMITH LAKE AND FULLER OVERFLOW

Currently Merrit Lake and Fuller Lake, along with adjacent watershed areas, flow into Smith Lake. The principal spillway for Smith Lake is a badly deteriorated 1 220 mm corrugated metal pipe under the dam and into the existing creek. The proposed dam is located on the existing Smith and Fuller Lake's dam.

The existing dam will be breached and a new, low risk water containment dam will be constructed approximately 90 m downstream of the Lewis & Clark Center. Since the failure of the proposed dam will not created a hazard to life or significant property, this dam will be classified as a low hazard dam and have a lower construction cost. By placing the dam downstream of the Center and providing an equalization structure under the Center, a pool will be created on the downstream side of the Center with the same water surface elevation as the water surface elevation on the upstream side of the Center.

The proposed dam will be an earthen dam with an impervious clay core center if clay material is available. The impervious core will extend 1 000 mm in to the bedrock, at approximately elevation 237.00. A rock filter will be place downstream of the clay core to control seepage.

Because the water surface elevations will be the same on both sides of the Center, there will be equal hydraulic pressure on each side of the Center foundation and fill. Because of the reduced hydraulic pressure, the existing spillways under the existing dam will be filled with concrete slurry and left in place.

The water levels will be equalized by a double 2 135 mm by 2 135 mm reinforced concrete box, 98.8 meters long. The inlet flow line elevation will be 238.750, approximately 250 mm below the measured pond bottom elevation. The discharge flow line elevation will be 238.70. The hydraulic slope to pass the probable maximum flood of 47.850 c.m.'s is .0092 mm and .0015 m/m for the 0.4 probable maximum flood.

The principal spillway will be a 1 830 mm pressure concrete cylinder pipe (pccp) by 55.3 m long. The principal spillway will include a 4.27 m square riser structure with over flow

elevation 242.730. The 50 year storm overflow elevation would 244.23. The principal spillway will be gated such that the lake can be completely drained through the principal spillway. The principal spillway pipe will have a rock filter around the lower 32 m of the 15 m of the pipe.

The emergency spillway will be 6.0 meters wide

The sequence of construction will be significant because of the existence of the water and sewer mains at the location of the proposed dam. The following sequence will be followed:

1. The existing dam will be breached at location of the berm between Fuller Lake and Smith Lake. The berm between the two lakes will be removed.
2. The existing culvert from the parking lots north of the Fuller Lake will be reconstructed to drain into the combined Fuller Lake and Smith Lake.
3. The culverts under the existing dam will be filled with flow able concrete mortar.
4. The double 2.135 m X 2.135 m reinforced concrete box will be constructed in place. The box will be constructed with water stop in the joints and a water seal coating on the inside of the box.
5. Fill will be placed for the building.
6. The 305 mm water main and the 610 mm sanitary sewer transmission main will be routed over the top of the fill adjacent to the Lewis & Clark Center.
7. The existing water and sewer mains will be removed.
8. The principal spillway will be constructed.
9. The low hazard dam will be constructed.

2.5 SANITARY SEWER EXISTING

Currently, 610 mm sanitary sewer lines run from the east and the west along the south face of the C.A.R.L. and flow into Manhole No. 4 (507) located approximately at the center and 5 m south of the building. The flow from Manhole 4 is to the south in a 610 mm transmission main. Manhole No. 4 will be replaced with a new manhole to the east of its present location. The 610 mm ductile iron sewer pipe place inside a 915 mm steel carrier pipe from existing Manhole 3 (508) to the relocated Manhole 4 (520). New 610 mm ductile iron sanitary sewer pipe will be installed from the proposed Manhole 4 (520) to Manhole 521 adjacent to the relocated lift station. The 610 mm sanitary sewer trunk line will be placed parallel and16 meters south east of the new Lewis & Clark Center. The slope of this sewer transmission main will be 0.175%. The transmission main will extend to proposed Manhole No. 110B located south east of the southeast corner of the auditorium. The proposed alignment then continues east to connect to existing Manhole 25. This alignment is necessary to allow construction of the low hazard dam while maintaining sanitary sewer service.

The existing pump station located south of the C.A.R.L. will be relocated to the south and east of its present location and will discharge into Manhole 521 as described above. A new manhole located over the existing sanitary sewer will be placed in the dock approach area.

A 254 mm sanitary sewer line runs from the Buffalo Soldier Monument and connects to the Interceptor sewer and Manhole 25 in the existing intersection of the existing Stimson

Ave. and Brundel Road. This sewer is in bad condition and will be beneath the proposed Center. It will therefore be abandoned. In its place, a 305 mm DIP sewer will be constructed from existing Manhole 109, located north east of Truesdale Hall, southerly to Stimson Avenue and then easterly along the existing Stimson Avenue alignment to again connect to Manhole 110B. Service lines will extend from this sewer to the Command Center and to the Auditorium wing of the proposed center.

All sanitary sewer work will be completed without disrupting existing service.

2.6 WATER

A 305 mm water transmission main originally passed directly through the Eisenhower Complex site from the northwest to the southeast to cross the creek at roughly the same location as the sanitary sewer, at the same location as the proposed low hazard dam. This transmission main was relocated around the east side of the Eisenhower Complex during construction of the facility. Tapping sleeves will be placed on this existing line at the southwest corner of the facility of the C.A.R.L. and a new 305 mm water transmission main will be constructed parallel and12 meters south east of the new Lewis & Clark Center. The 305 mm transmission main will connect to the proposed water and fire service line constructed adjacent to the existing Stimson Avenue.

Fire protection and water services are also required at the south end of the Center. A 203 mm ductile iron water main will be constructed beginning at the existing 203 mm water main located in front of Building 1109 on the east side of Buckner Avenue south of Stimson Avenue. This 203 mm water main will follow the existing Stimson Avenue alignment and connect to the 305 mm main south east of the southeast corner of the Auditorium. This 305 mm main will continue along the Stimson Avenue alignment and connect to the existing 305 mm main at the intersection of Stimson Avenue and Bundle Avenue. This proposed main will provide system looping, increased capacity and redundant water supply for fire protection.

2.7 SITE DRAINAGE

Where possible, site will have surface drainage. An underground collection system will be provided in the ceremonial entrance area.

2.8 GAS

Gas services are anticipated only for the cafeteria service area. This service will be connected to the existing 2-inch gas located south of the CARL. This line is located on the south side of Wint Avenue and then extends northerly along Gibbon Avenue.

2.9 TELECOMMUNICATION AND FIBER OPTICS

The communications services are located on Gibbon Avenue east of the C.A.R.L. These will be extended south along Gibbon Avenue to the new Lewis & Clark Center.

2.10 MONUMENTS

The markers for the Ceremonial Grove Trees will be relocated on the site, probably south of existing Stimson Avenue. The Ceremonial Trees will either be moved or replaced.

The Berlin Wall Monument will be relocated on site.

PART 3 - ARCHITECTURAL

3.1 GENERAL DESCRIPTION

The Command and General Staff College is located on a sloping site overlooking Smith Lake. The new facility will be bound on the north by the CARL Library, to the east by Wint Avenue Housing, to the west by Truesdell Hall southwest along the face of Smith Lake dam approximately to the existing Stimson Avenue. The existing dam will be breached and a new, low risk water containment dam will be constructed approximately 90 m downstream of the Command and General Staff College. This will create a pool of water on the downstream side of the facility with the same water surface elevation as the water surface elevation on the upstream side.

CGSC is designed as three separate wings; classroom wing, an administration wing, and an auditorium wing with both main floor and balcony seating. The Auditorium wing is located adjacent to the classroom wing and to the main visitor entry so that it can serve both the student population and greater community. A central great hall serves as the central internal organizing space that links all three wings around a four story atrium. This circulation hub provides a major gathering place as well as an area to present many of the new and existing displays related to the history and future of the CGSC's role in shaping the leadership of the Army. Additionally, the trophy lounge, main auditorium and main lecture hall open into the great hall efficiently utilizing the area as their prefunction/lobby space.

The classroom wing is directly adjacent to the Combined Arms Research Library (CARL). An internal link is provided at the first floor level which provides easy access to the CARL for both students and staff. This wing houses 92 state of the art classrooms modeled after TRADOC'S classroom XXI standards. The classrooms are stacked on four levels with faculty office space directly across the hall from the classrooms. In support of the classrooms, this wing includes a language laboratory, presentation rooms, a computer lab, classroom services, and other support services that include a bookstore, barber/beauty shop, and cafeteria.

Administration functions related to the command group and college leadership are collocated near the main visitor and ceremonial entry. Community support spaces including the trophy room, general officers' prep rooms, Auditorium and Main Lecture Hall are also located in this area. Digital Leader Development Lab (DLDC) Secure classrooms, computer labs and a secure compartmented information facility (SCIF) with secure classrooms and computer lab are col-located on the lowest level of the administration wing.

A Prayer Room will be located just inside CARL Library at the Link to the new facility.

The design of the facility provides visible, accessible, and separate entry points for visiting dignitaries, community members, staff, instructors, and students. Building functions that require or allow public access will be located near the public entry off Stimson Avenue. Students typically will enter from the north parking lots directly into CARL or the classroom wing. An enclosed bridge will be constructed between CARL and the new CGSC building providing easy access to research facilities for students.

3.2 DESIRED IMAGE

As a prominent new building at Fort Leavenworth, the major challenge of the Command and General Staff College is to capture both the historic and future visual integrity of the post. Careful selection of exterior building materials that positively impact and blend with the surrounding architecture will be undertaken. Materials will be evaluated with a range of quality levels in mind to achieve the shared values of low operating and maintenance costs as well as energy efficiency and durability.

The interior architecture will create an open, airy, sophisticated space that respects the history of the Command and General Staff College. Large windows in the Great Hall and main corridor of the classroom wing allow ambient light to penetrate the building. Exterior materials wrap around the exterior corners and extend beyond the glazing into the interior spaces. State-of-the-art communications technology that is essential to the function of this important facility will be seamlessly integrated with the interior architecture.

3.3 APPLICABLE CRITERIA

Building Code:
UBC 97

National Fire Protection Association
NFPA 101 Life Safety Code 2000
NFPA 10 Portable Fire Extinguishers
NFPA 221 Fire Walls and Barriers
NFPA 80 Fire Doors and Fire Windows

Military Handbooks
MIL HDBK 1008C Fire Protection for Facilities Engineering Design and Construction

Physical Security
Department of Defense Antiterrorism Standards for Buildings UFC 4-010-10 (latest Draft)
DCID 1/21 Manual for Physical Security for Sensitive Compartmented Information Facilities (SCIF) 30 January 1994.

Accessibility
Uniform Federal Accessibility Standards (UFAS)

US Army Corps of Engineer Criteria

3.4 LIFE SAFETY

The general occupancy classification for this facility is group B Business (UBC 97). Areas within the facility are classified as Assembly group A-1 (UBC 97), Assembly group A-2.1 (UBC 97). Construction type is Type II FR. Based on the construction type, fire proofing of the structural steel members is required. The entire building is provide with a supervised automatic fire suppression system. Egress and life safety is designed to meet NFPA 101 (latest edition) as required by MIL HDBK 1008C. Refer to Appendix B for the complete Life safety code analysis.

3.5 HANDICAPPED ACCESSIBILITY

The entire facility except the mechanical and electrical equipment rooms is designed to be accessible to the physically handicapped.

3.6 NUMBER OF PERSONNEL USING THE FACILITY

It is anticipated that approximately 2000 people will occupy this facility on a daily basis.

3.7 HOURS OF OPERATION

The facility will normally be open from 0700 hr to 01900 hr for regular classroom activity. Extended hours will be available for use of the auditorium for community functions.

3.8 SPiRiT

The Army Command and General Staff College programmatic requirement is to achieve a SPiRiT rating of bronze. SPiRiT v 1.4 is based on LEED 2.0 Green Building Rating System ™ and is used with full legal agreement between the Corps and the USGBC. The SPiRiT system is comprised of seven (7) fully integrated divisions in order to create a holistically designed facility. The strategies employed for the CGSC for each of these divisions are as follows:

3.9 TYPE AND METHOD OF CONSTRUCTION

3.9.1 Exterior:

Exterior Walls: Typical exterior wall construction will utilize red brick and cast stone on a cold formed metal framing assembly anchored to the building's steel frame.

Materials used in constructing the exterior veneer walls from exterior face to interior face of wall will be:
100mm brick veneer
25mm air space
25mm rigid insulation used to minimize thermal short circuits by brick ties.
13mm exterior sheathing
200mm Cold formed metal framing
RSI 3.5 thermal foil faced batt insulation
16mm gypsum board

Roof System: Supporting roof members will be sloped at 21mm per meter minimum for positive drainage. Roof areas will be drained internally utilizing both roof and overflow drains. Rigid insulation mechanically attached to the metal roof deck will provide sufficient thermal resistance (RSI value) required to meet the design's needs. The roof membrane will be a two ply modified bitumen roofing system UL class A FM 1-90A.

Floor System: The first floor system will consist of a structural hollow core slab supported by grade beams and piers. The elevated floor structural

system will consist of a concrete slab on a galvanized steel floor deck supported by structural steel beams.

Exterior Glazing: Exterior insulating glazed units will total 25mm in thickness. The exterior light will be 6mm clear glass with a low e coating on the no. 2 surface. The interior light will be 6mm laminated glass consisting of two nominal 3mm glass panes bonded together with a minimum of a 0.75mm polyvinyl-butyral (PVB) interlayer.

Exterior Window Frames: Exterior window frames will be thermally broken and constructed from aluminum of sufficient size to withstand a static load of 7 kilopascals applied to the surface of the glazing. Frame and mullion deformation shall not exceed 1/160 of the members length. Glazing will have a minimum frame bite of 25mm.

Exterior Doors: There will be two types of exterior doors other than glazed doors. They will be insulated hollow metal doors installed in hollow metal frames and overhead coiling doors with insulated door curtains located at the dock area.

3.9.2 Interior:

The highest level of finishes used in this facility will be in the main Conference Room, Command Suite and Deputy Commandant"s office. Finishes in the Great Hall, Auditorium and Main Lecture will project the appropriate image and atmosphere desired and suitable for the space intended. Interior finishes selected for the Classrooms and labs will be durable and functional in nature.

Interior Partitions: Interior partitions will be constructed of light gauge metal studs and cold-formed metal framing surfaced with 16mm type X gypsum wallboard. Finished surfaces will either be painted or covered with vinyl wall fabric in special locations requiring greater durability of finishes. Ceramic wall tile will be used full height on all walls within toilet and shower areas. Sound attenuation batts will be installed in partitions requiring specific STC ratings. Classrooms and areas requiring amplified speech will have STC rating of 50. Private offices and corridor walls will have STC 42 walls.

Flooring Material: Floors will be finished with a variety of materials depending on the location and use. Exposed concrete floors will be painted or sealed with a clear sealer. Office areas will be covered with carpet tile. The floors in the Great Hall will be surfaced with an epoxy terrazzo material for durability. Restroom floors will surfaced with a thick set epoxy terrazzo. The Deputy Commandants area will be hardwood with an inset broadloom carpet. Classrooms, computer rooms, and computer labs will have a 150mm raised floor system to provide maximum flexibility in power, data, and communication systems throughout classrooms. All access floors will be covered with carpet tile. The café and food service areas will be surfaced with an epoxy terrazzo.

Ceilings: Ceilings typically will be suspended acoustical tile utilizing a 600 x 600 mm grid. Restroom ceilings will be suspended 16mm type X gypsum wallboard. Typical corridor ceilings will be a combination of gypsum board soffits with acoustical ceiling tile. Lecture Hall and Auditorium will have suspended gypsum board ceiling systems for sound reflection and acoustical panels as required for sound absorption.

Wood Wall Paneling will be used in the Trophy Lounge, Command Suite, Main Lecture Hall, and Auditorium-MDF panel core of veneer panel to be fire-treated.

Millwork: Command Suite, Trophy Lounge, Main Lecture Hall, Auditorium, and Great Hall will be AWI Premium Quality with wood veneer finishes. Classrooms and typical office areas will be AWI custom quality level with plastic laminate finishes.

Stained Glass windows: The important stained glass pieces that will be removed from Bell Hall will be restored and installed at selected locations throughout the facility.

Display cases: Built in display cases will be provided throughout the facility to showcase historic memorabilia and gifts from foreign alliances.

Information, Interactive communications and exhibits: Transparent projection screens that alow for a complete new way of visual presentation of information are being proposed for use in the Great Hall. High image projectors will be used to project images onto these screens. The screens when not being used are highly transparent which make them ideal complement to the surrounding interior architecture. These screens can be suspended from the ceiling, mounted on or integrated into walls, or stand alone on the floor.

Interior Doors and Frames: Typical interior door frames at offices and classrooms will be painted hollow metal with solid core hardwood veneer doors. Doors and frames located in STC rated walls will be required to be produced as a tested assembly.

Lockers: Book bag and short coat lockers for all 1450 students will be provided on each floor of the classroom wing on the secondary corridor. Lockers will also be provided in the shower areas located on the first level of the facility.

Window Blinds / Shades: Roller shades will be provided for individual control of light and privacy at office areas. Blackout shades will be used in the Main Control Room for light control and privacy.

Roof mounted clearstory windows: The south facing clearstory windows will provide the opportunity for natural light to filter through floor openings on level three and four. These openings are located adjacent to the corridors between the classrooms and faculty offices. Not only will natural light filter into these spaces but into the faculty gallery located on level two.

3.10 EQUIPMENT, FURNITURE, AND FURNISHINGS

Computer equipment will be government supplied and installed. Pre-wired workstations are not part of the MCP and will be purchased with OMA funds. Office furniture and accessories are included in the comprehensive interior design package. The construction contractor will furnish equipment and accessories that are attached to the building including, but not limited to the following:

Casework
Shelving
Toilet and lavatory fixtures
Fire annunciator panel
Signage
Fire Extinguisher Cabinets

3.11 COMPREHENSIVE INTERIOR DESIGN (CID)

CID binders will be submitted as a separate package.

3.12 SIGNAGE

Signage, both exterior and interior, will be coordinated with the user and developed as an integral part of the design to coordinate and complement the architectural quality of the facility. Exterior signs will be scaled respective to the primary viewpoint and developed for minimal maintenance and vandalism. Interior signage will be coordinated with installation requirements to provide an interchangeable system that is low maintenance and meets requirements of the Americans with Disabilities Act (ADA).

3.13 PHYSICAL SECURITY

Physical Security will conform to the requirements set in the Department of Defense Antiterrorism Standards for Buildings UFC 4-010-10 (latest Draft) and DCID 1/21 Manual for Physical Security for Sensitive Compartmented Information Facilities (SCIF) 30 January 1994.

Keying: Locking hardware core systems will be master keyed to the CGSC building only. Interchangeable or removable cores will be used or approved by the base locksmith. Electrical and mechanical rooms will be keyed to match the existing master key for the base mechanical and electrical rooms. Key and hardware will match the existing systems used at Fort Leavenworth. Security hardware and IDS systems will be developed and coordinated with the user and fire personnel for emergency access purposes.

3.14 ESTIMATE

Estimate will be submitted as a separate package.

3.15 AREA TABULATIONS

Refer to Appendix C for gross and net area tabulations.

PART 4 - LANDSCAPE ARCHITECTURE

4.1 LANDSCAPE ARCHITECTURE

The landscape design for the Command and General Staff College at Ft. Leavenworth, KS will incorporate sustainable design elements, hardscape features, force protection features, and a variety of plant materials to create a well balanced, cohesive, and pleasing environment that will be long lasting and require little maintenance. Emphasis will be placed on creating attractive and functional entry points to the building as well as practical connections to other functions adjacent to the site.

4.2 SUSTAINABLE DESIGN

Sustainable site design is resource conservation that protects ecosystems, conserves resources, improves the outdoor environment and promotes to improve employee morale and health. It provides savings of energy, water and other wastes. Sustainable site design uses xeriscape principles, minimizes disturbance to the existing site, reduces heat islands, and minimizes the amount of impervious pavement. Xeriscape principles promote the use of native, well adapted plant material which reduces the maintenance and irrigation requirements. Intrusion into the natural environment will be limited. Lighting and security features will be done in a manner so that they are not detracting or intimidating to the user.

4.3 HARDSCAPE DESIGN

The hardscape design for the proposed facility will utilize materials and elements that presently exist at the College to create entry plazas and people spaces that are well organized and functional and that provide space for large groups as well as more private areas for smaller discussions or studying. Site furniture, that is appropriate to the site, will be placed in convenient locations.

4.3.1 Vehicular Access

The main entrance to the facility will be at the south end facing Stimson Avenue. This entrance will be a Ceremonial Plaza entrance that can also be used for special outdoor gatherings. The paving in this plaza will be a combination of colored concrete and interlocking concrete pavers. These elements will reduce the heat reflectance and the run-off meeting sustainable design requirements. Access to this area will be controlled by cameras and card reader access that will control retractable bollards. A 10-car Command parking lot will be constructed to the west of the ceremonial entrance. One space has been designated for ADA parking and is van accessible. A facility sign will be located at the control point. The Ceremonial Plaza will be lined with the flagpoles representing the countries attending the college. The south end will be accented with the main flagpole and the lamp monument. Space has been provided for placement of a cannon to be used during special occasions.

A 40-car parking lot with ADA parking facilities is located at the southeast corner of the auditorium. This lot is accessed off of Stimson Avenue and is controlled by a card reader with an arm. The roadway into this lot is designed

for semi-trailer truck access to the back of the auditorium. Access to the service area is restricted and is controlled by a force protection gate.

Access to the loading dock of the Lewis & Clark Center will be from the south of the C.A.R.L. using the current dock access at the intersection of Wint and Gibbon Avenues. Access from Wint Avenue has been eliminated to accommodate force protection requirements. A cul-de-sac has been incorporated at the West end of Wint Avenue to provide a turn around for the neighborhood residents.

Replacement parking and new parking is a requirement of this project. Any new parking is to be located outside of the 100 meter standoff distance. The existing parking lot north of Truesdale Hall will be extended to the east and west to compensate for removal of the existing parking lot east of Truesdale Hall. This parking lot will be removed to accommodate the new 10-car lot and to meet force protection guidelines. Parking is at a premium at Ft. Leavenworth and the need for additional parking is increasing. The desired target is to provide 800 new parking spaces. To achieve this target number, the existing lot north of Bell Hall has been reconfigured and extended to the south. “Abrams Loop” will be demolished and a new parking lot will be located in its place to accommodate 281 new parking spaces. The existing parking lot to the south of Stimson Avenue has been extended to the north and to the west providing 130 new spaces. A new lot is to be located north of Stimson Avenue to the southeast of the project and it will provide 389 spaces. However, with a new dam being built downstream of the new building, some of these spaces may be lost due to grading requirements.

4.3.2 Pedestrian Access

Walkways have been incorporated into the site design to provide safe, convenient access from the parking areas and adjacent site elements for the users of the building. Sidewalks are provided at three points on the west side of the proposed 389 space parking lot to make it convenient for all to access the site. The northern most walkway runs along the north side of the 40-space parking and enters the Ceremonial Grove of trees located on the south side of the auditorium. The middle walkway cuts across the site and encircles the proposed new location for the Berlin Wall monument. The southern most walkway runs along the south side of the parking lot and intersects the middle walkway and then continues north through the Ceremonial Grove. The three walkways merge and continue west to the main walkway into the Ceremonial Plaza area. An additional walkway runs along Stimson Avenue and intersects a walkway between the new building and Truesdale Hall which leads the user down to the pond and a vista of Grant Hall. A walkway at the northwest corner of the Ceremonial Plaza extends west to the walkway between the buildings and intersects at a gathering area. Another walkway at the northwest corner of the building extends west to this walkway as well. A gathering area is located near the pond where the promenade along the north side of the building joins the walkway between the two buildings by way of a ramp down to the existing walk.

The secondary walkways will be constructed of white portland cement with paver accents. The Ceremonial Plaza, the promenade on the north side of the building and the gathering areas will be constructed of interlocking concrete pavers and colored concrete. This will aid in the reduction of heat build up due to their light coloring.

4.4 PLANT MATERIAL

The plant material chosen for the proposed facility will be plants that are native or well adapted to the area and that require little maintenance. As much of the natural site and existing plants as possible will be retained to create a natural environment for the facility. Large deciduous trees will be utilized to provide shade and to give more of a people scale to the site. A variety of evergreen trees will be incorporated into the design to provide a permanent backdrop, to screen unsightly views, and to give added texture to the site. Smaller ornamental trees will be used to provide additional variety in size and texture, to accent special areas, and to add spring color to the site. A mixture of deciduous and evergreen shrubs will be provided to accent entryways, walkways, and plazas. Foundation plantings will be planted at the base of the building to bring the building and the site together. The plant material will be chosen from the following plant material list.

TREES

Hackberry	Celtis occidentalis
Green Ash	Fraxinus pennsylvanica ‘Marshall Seedless’
Sweet Gum	Liquidambar styraciflua
Tulip Tree	Liriodendron tulipifera
Pin Oak	Quercus palustris
Northern Red Oak	Quercus rubra
American Linden	Tilia americana
White Pine	Pinus strobus
Red Sunset Maple	Acer rubrum ‘Red Sunset’
River Birch	Betula Nigra ‘Clump’
Red Mud	Cercis canadensis
American Hornbeam	Carpinus caroliniana
Washington Hawthorn	Crataegus phaenopyrum
Autumn Purple Ash	Fraxinus americana ‘Autumn Purple’
Thornless Honeylocust	Gleditsia triacanthos ‘Inermis
Deciduous Holly	Ilex decidua
Eastern Red Cedar	Juniperus virginiana
Bur Oak	Quercus macrocarpa
Sawtooth Oak	Quercus acutissima
Scarlet Oak	Quercus coccinea
Flowering Dogwood	Cornus florida
Canada Red Cherry	Prunus virginiana ‘Canada Red’
Willow Oak	Quercus phellos
Shumard Red Oak	Quercus shumardii
Bald Cypress	Taxodium distichum
Sycamore	Platanus occidentalis

SHRUBS

Staghorn sumac	Rhus typhina
Blackhaw Viburnum	Viburnum prunifolium
Potentilla	Potentilla fruiticosa
Bailey Redtwig Dogwood	Cornus baileyi
Golden Currant	Ribes aureum
Woods Rose	Rosa woodsii
Arrowwood viburnum	Viburnum dentatum

GRASSES

Native River Grass	Sea Oats

GROUND COVER

Wintercreeper	Euonymus fortunei 'Coloratus'
Vinca	Vinca Minor
Baltic Ivy	Hedra helix baltica

Planting beds have been kept to a minimum to reduce maintenance and water consumption. The Ceremonial Plaza area has the most concentration of plants. The planting beds and the large oval turf area reduce the heat islands in this large open area. Accent planting are provided around the Berlin Wall monument, at gathering areas, and at the entrances to the parking areas. Shrubs are located along the force protection berms to provide color, texture and added security.

4.5 FORCE PROTECTION

The force protection requirements for this project require a 25 meter standoff distance between the building and any parking areas as a minimum. The installation has requested that force protection measures be designed into this project to meet a 100 meter standoff wherever possible. This requirement is met in all but three places, the housing area to the south, Truesdale to the west and the historic housing to the east encroach on this limit. A restricted 10 space parking area in the Ceremonial Plaza has been allowed within the 25 meter standoff. A 40 space parking area at the southeast corner is located just outside the 25 meter standoff but within the 100 meter standoff.

Force protection will be incorporated into the landscape design in a variety of ways. The use of plant material, berms, ravines, boulders, and hardscape elements will be used throughout the design to aid in ensuring the safety of the occupants of the building while preserving as much of the natural beauty of the site as possible. A combination seat wall/retaining wall encircles most of the site. It becomes an architectural feature in areas near the park and pond areas. Decorative sliding gates will be utilized to close off Stimson Road during periods of high security. Berms with post and cable fencing are placed at openings in the wall in areas where people will be crossing the standoff line. The post and cable has also been located in the area behind the housing area to the south where a less intrusive force protection barrier is preferred. The post and cable fencing is softened by the use of native plants and large boulders. Sturdy gates,

stationary bollards, and retractable bollards have been incorporated at the openings in the force protection barrier. (refer to appendix F)

4.6 SITE IRRIGATION SYSTEM

The conservation and restricted use of irrigation water is an important factor in sustainable design. The proposed irrigation system for the project has been kept to a minimum. The proposed system will provide drip irrigation for the plants and low gallonage spray heads for the turf in the Ceremonial Plaza area only. The remainder of the site will utilize a quick coupler system to help with the initial establishment of the plants and for additional watering during severe droughts. The system will be fully automatic with the exception of the quick couplers which are manually operated. (refer to appendix F) The system will also be compatible with existing components currently used at the installation. The water source will be from within the building in the mechanical room on the northeast corner. The backflow preventer for the system will also be located in this room.

PART 5 - STRUCTURAL

5.1 PROJECT DESCRIPTION AND REQUIREMENTS

The new 4-story Command and General Staff College (CGSC) instructional facility will be located at Fort Leavenworth, Kansas. The facility will be built adjacent to and adjoins the Combined Arms Research Library (CARL). The facility will include classrooms, administrative and faculty offices, conference rooms, one large auditorium, lecture halls, a secure compartmented information facility (SCIF), in addition to the restrooms, mechanical and electrical rooms required to support the building. The building will be designed in accordance with U.S. Army Corps of Engineers criteria and publications including Antiterrorism / Force protection criteria and other recognized national standards.

5.2 STRUCTURAL SYSTEM

5.2.1 Structural Framing System

The CGSC facility will utilize a structural steel building frame system to accommodate the long spans and open areas required by the function the project. The system will be an essentially complete building frame system composed of composite structural steel beams and girders, trusses, and columns that will resist vertical loads. Structural steel special moment resisting frames and ordinary concentric braced frames will resist lateral loads. The column layout for the CGSC building is generally regular. The structural system will have three building seismic / expansion joints, one of which abuts the adjacent CARL building. The CGSC is classified as non-combustible, Type II-Fire Resistive according to the ICBO UBC 1997.

The structural system will incorporate the requirements of the “Department of Defense Antiterrorism Standards for Buildings (25 January 2002) including “Guidance on Structural Requirements (5 March 2001). Areas three stories or more will be designed to prevent progressive collapse. Standoff distances will be based on the facility having a controlled perimeter.

5.2.2 Roof Framing System

The majority of the CGSC facility will utilize a low slope roof. The roof areas will slope a minimum of 21mm per meter (1/4 inch per foot). A majority of the roof slope will be accomplished by sloping the structural roof framing. The roof structural system will consist of 38mm (1-1/2”), wide rib, steel roof deck supported by structural steel beams or open web steel joists. Typically, structural steel beams will be supported by a structural steel girder / column system. Structural steel beams and / or open web steel joists will be supported by a structural steel trusses and beams at the Auditorium. The steel roof deck will act as a flexible diaphragm by which lateral loads are distributed to the lateral load resisting system by tributary area.

5.2.3 Elevated Floor Framing System (Levels 2, 3, & 4)

The elevated floor framing structural system will consist of a 190mm (7-1/2" total thickness) normal weight concrete slab on 76mm (3") galvanized steel composite floor deck supported by structural steel composite beams. Steel beams will be supported by a structural steel composite girders and columns. The floor deck will act as a rigid diaphragm by which lateral loads will be distributed to the lateral load resisting system.

5.2.4 Lateral Load Resisting System

Structural steel special moment resisting frames and ordinary concentric braced frames will resist wind and seismic lateral loads. The steel special moment resisting frames will provide lateral load resistance for the majority of the building. Moment frames were chosen to allow flexibility required by the user and the layout of the building. The concept, location, and orientation of the moment frames have been strategically integrated to work with the progressive collapse force protection requirements.

Steel ordinary concentric braced frames will provide lateral load resistance for the Auditorium. The structural steel special moment resisting frames and the ordinary concentric braced frames will transfer the lateral loads to the foundation.

The structural system will incorporate the requirements of the "Department of Defense Antiterrorism Standards for Buildings (25 January 2002) including "Guidance on Structural Requirements (5 March 2001). Areas three stories or more will be designed to prevent progressive collapse. Exterior structural steel special moment resisting frames will be designed to meet the progressive collapse requirements. The structural steel special moment resisting frames will feature the use of ICBO pre-qualified "SidePlate" connections technology.

5.2.5 Foundation and Level 1 Floor Framing System

A subsurface investigation report for the CGSC building will not be available prior to the 35% submittal. Preliminary design and cost estimates for the CGSC foundation system are based on the foundation system used at adjacent Combined Arms Research Library (CARL) and it's subsurface investigation report. The CARL facility utilizes a deep foundation system consisting mainly of auger cast piles, with some drilled piers, which support individual columns, the exterior wall and supporting grade beams, and a first floor cast-in-place structural slab. The preliminary design for the CGSC building will use a similar system.

The majority of the Level 1 structural floor slab will consist of a 50mm thick normal weight concrete reinforced topping slab over a 200mm thick precast hollow core concrete slab. The Auditorium Level 2 structural floor slab will consist of cast-in-place concrete slabs. The structural slabs will be placed on a vapor retarder over 150mm compacted capillary water barrier which

functions a forming for the structural slab. The subgrade below the capillary water barrier will be compacted.

Grade beams spanning between auger cast piles or drilled pier foundations will support structural concrete slabs and exterior walls. Auger cast piles or drilled pier foundations will also support individual columns.

The final foundation system will be based on recommendations contained in the "Subsurface Investigation Report" specifically for the CGSC project.

5.2.6 Wall and Partitions

The exterior walls of the CGSC facility will incorporate a brick veneer and glass façade. The 100mm brick veneer will be backed by cold-formed metal framing (CFMF) wall studs spanning between the foundation, floor, and roof diaphragms. The brick veneer will be separated from the CFMF wall studs by a 50mm gap (min.). Interior non-structural partitions will be constructed of steel studs and gypsum board.

5.3 DESIGN CRITERIA

The design publications listed below will be used as sources of criteria for structural design. The criteria from these sources may be supplemented, but not supplanted, by applicable criteria contained in nationally recognized codes, standards, and specifications.

U.S. Army, Air Force, and Navy Technical Instructions, Technical Manuals, or Engineering Regulations

TI 800-01	Design Criteria (20 July 1998, Updated 02 Aug 1999)
UFC 3-310-01 (TI 809-01)	Load Assumptions for Buildings (June 2000)
TI 809-02	Structural Design Criteria For Buildings (1 September 1999)
TI 809-04	Seismic Design for Buildings (31 December 1998)
TI 809-07	Design of Cold Formed Load Bearing Steel Systems and Masonry Veneer/Steel Stud Walls (30 November 1998)
TI 809-29	Structural Considerations For Metal Roofing (3 August 1998, Updated 30 Aug 1999)
TI 809-52	Commentary on Snow Loads (3 August 1998)
TI 818-02	Design of Deep Foundations (August 1998)

TM 5-809-3/AFM 88-3, Chap. 3	Masonry Structural Design For Buildings (30 October 1992)
TM 5-809-12/AFM 88-3, Chap. 12	Concrete Floor Slabs On Grade Subjected To Heavy Loads (25 August 1987)
TM 5-818-1/AFM 88-3, Chap. 7	Soils and Geology Procedures For Foundation Design of Buildings and Other Structures (21 October 1983)
TM 5-853-1/AFMAN 32-1071, Vol. 1	Security Engineering Project Development (12 May 1994)
TM 5-853-2/AFMAN 32-1071, Vol. 2	Security Engineering Concept Design (12 May 1994)
TM 5-853-3/AFMAN 32-1071, Vol. 3	Security Engineering Final Design (12 May 1994)
TM 5-1300/AFR 88-22	Structures To Resist The Effects Of Accidental Explosions (19 Nov. 1990)
ER 1110-345-700	Design Analysis, Drawings and Specifications (30 May 1997)

Department of Defense (DoD) Publications

DoD Publication	Department of Defense Antiterrorism Standards for Buildings (Draft, 25 January 2002)
DoD Publication	Department of Defense Interim Antiterrorism / Force Protection Construction Standards – Guidance on Structural Requirements (Draft, 5 March 2001, R1-1, September 2001)

American Concrete Institute (ACI) Publications

ACI 318-99	Building Code Requirements for Structural Concrete and Commentary

American Institute of Steel Construction (AISC) Publications

AISC – ASD	Manual of Steel Construction, Allowable Stress Design (ASD, 9th Ed.)
AISC – LRFD	Manual of Steel Construction, Load and Resistance Factor Design (LRFD, 2nd Ed.)

American Society of Civil Engineers (ASCE) Publications

ASCE 7-98	Minimum Design Loads for Buildings and Other Structures

American Welding Society (AWS) Publications

AWS D1.1	Structural Welding Code - Steel

Federal Emergency Management Agency (FEMA) Publications

FEMA 302	NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other Structures
FEMA 303	NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other Structures (Part 2 – Commentary)

Portland Cement Association (PCA) Publications

Portland Cement Association	Notes on ACI 318-99

Steel Deck Institute (SDI) Publications

Steel Deck Institute	Diaphragm Design Manual (2nd Edition, 1987)

Steel Joists Institute (SJI) Publications

Steel Joist Institute	Standard Specification Load Tables, and Weight Tables for Steel Joists and Joists Girders

5.4 STRUCTURAL DESIGN LOADS AND FOUNDATION CRITERIA

Structural loading criteria will be developed using criteria sources and following the procedures indicated below. The CGSC building will be classified as “Category III” in accordance with ASCE 7-98 Table 1-1 for calculation of wind and snow loads. The CGSC building will be classified as “Seismic Use Group II” in accordance with TI 809-04 for seismic loads.

5.4.1 Dead Loads

Minimum design dead loads for common building materials will be obtained from ASCE 7-98. Loads for materials not listed in ASCE 7-98 and equipment loads can be obtained from other recognized sources.

5.4.2 Roof Live Loads and Snow Loads

5.4.2.1 Minimum Roof Live Load

A minimum roof live load of 0.96 kPa (20 psf) will be maintained in accordance with the KCD-SDCC. The minimum roof live load will

not be reduced. The minimum roof live load will be applied in accordance with ASCE 7-98 and will be used as a loading condition for the roof and will not be in addition to calculated snow loads.

5.4.2.2 Roof Snow Load

Roof snow load will be applied in accordance with UFC 3-310-01 (formerly TI 809-01, references ASCE 7-98). A ground snow load (Pg) of 0.96 kPa (20 psf) with a 50-year mean recurrence interval will be used in determining the roof snow load. Drift loads will be taken into consideration. Other factors used in determining snow loads are as follows:

Terrain Category	=	C (ASCE 6.5.3)
Ce (Exposure Factor)	=>	1.0 (ASCE Table 7-2, Partially Exposed)
Ct (Thermal Factor)	=	1.0 (ASCE Table 7-3, All Structures UNO)
I (Importance Factor)	=	1.1 (ASCE Table 7-4, Category III)
Pf (Flat Roof Snow Load)	=	1.05 kPa (Pf=0.7CeCtIPg or Ipg=22 psf)
Cs (Slope Factor)	=	1.0 (ASCE Fig. 7-2, Warm Roof)
Ps (Sloped Roof Snow Load)	=	1.05 kPa (Ps=CsPf)

5.4.2.3 Rain-On-Snow Load

A rain-on snow load of 0.24 kPa (5 psf) will be applied in accordance with the KCD-SDDC and ASCE 7-98 for roof slopes less than ½ inch per foot.

5.4.3 Floor Live Loads

The live loads used for this facility will be in accordance with ASCE 7-98 except as modified herein. Floor live loads may be reduced in accordance with ASCE 7-98.

5.4.3.1 Typical Floor Live Loads (Unless Notes Otherwise)

Location	Uniform Live Load*	Concentrated Live Load **
Lobbies and Corridors at First Floor	4.79 kPa (100 psf)	8.90 kN (2000 lbs.)
Corridors above First Floor	3.83 kPa (80 psf)	8.90 kN (2000 lbs.)
Classrooms	2.39 kPa (50 psf)	8.90 kN (2000 lbs.)
Dining Rooms & Restaurants	4.79 kPa (100 psf)	----------
Offices	2.39 kPa (50 psf)	8.90 kN (2000 lbs.)
Bookstore	X.XXkPa (XX psf)	XXX kN (XXXXlbs.)
Restrooms	2.87 kPa (60 psf)	----------
Heavy Storage	11.97 kPa (250 psf)	----------
Light Storage	5.99 kPa (125 psf)	----------
Kitchen	7.18 kPa (150 psf)	----------
Mechanical & Electrical Rooms	9.58 kPa (200 psf)	----------
Boiler Room (Framed)	14.36 kPa (300 psf)	----------
Elevator Machine Room	7.18 kPa (150 psf)	----------

Stairs	4.79 kPa (100 psf)	1.33 kN (300 lbs.)
Theaters (Auditorium)		
Fixed Seats	2.87 kPa (60 psf)	----------
Lobbies	4.79 kPa (100 psf)	----------
Platforms	4.79 kPa (100 psf)	----------
Stage Floors	7.18 kPa (150 psf)	----------
Dressing Rooms	1.92 kPa (40 psf)	----------
Projection Rooms	4.79 kPa (100 psf)	----------
Catwalks	1.20 kPa (25 psf)	----------
Grid-Iron Floor or Fly Gallery	2.87 kPa (60 psf)	----------
Well Beams	3.65 kN/M (250 plf per pair)	
Header Beams	65.67 kN/M (4,500 plf)	
Pin Rail	3.65 kN/M (250 plf)	
Partition Allowance	0.96 kPa (20 psf)	----------

*Partition allowance live load is additive to floor live loads unless the specified live load exceeds 3.83 kPa (80 psf).

**8.90 kN (2,000 lbs.) concentrated load applied in any 762 mm x 762 mm (2.5 ft. x 2.5 ft.) floor area. 1.33 kN (300 lbs.) concentrated load applied at center of any stair tread.

5.4.4 Wind Loads

Wind loads for both the main wind force resisting system and for components and cladding will be determined in accordance with UFC 3-310-01 (formerly TI 809-01, references ASCE 7-98) using the following parameters:

Basic Wind Speed, V	= 40.2 m/s	(90 mph, Fort Leavenworth)
Wind Importance Factor, I	= 1.15	(Category III, per KCD-SDCC)
Wind Exposure Category	= C	(Per KCD-SDCC)
(50-year mean recurrence interval)		
Internal Pressure Coefficient	= +/- 0.18	(Enclosed Bldg.)

5.4.5 Seismic Loads

Seismic loads will be determined in accordance with TI 809-04. The total lateral seismic force will be determined by the following parameters:

Seismic Use Group	= II
Seismic Importance Factor, I	= 1.25
Spectral Response Acceleration, Ss	= 0.13 (per KCD SDCC)
Spectral Response Coefficient, S1	= 0.06 (per KCD SDCC)
Site Characteristics	= Class D
Seismic Design Category	= B
Response Modification Coefficient, R	= 8 (Special Steel Moment Resisting Frames, Typ. U.N.O.)
Response Modification Coefficient, R	= 5 (Ordinary Steel Concentric Braced Frames, Auditorium)

5.4.6 Interior Partition Lateral Loads

Interior partitions will be designed for a 240 Pa (5 psf) pressure normal to the partition. The deflection will not be more than 1/360 the span of wall for brittle finishes and 1/240 for flexible finishes. Other design requirements such as seismic may be more restrictive and control the design of the partitions.

5.4.7 Other Loads

Other loads used for this facility will be in accordance with ASCE 7-98.

5.4.8 Load Combinations

Load combinations will be in accordance with ASCE 7-98 and TI 809-04 and will be used in combination with AISC Specifications and ACI 318.

5.4.9 Foundation Design Criteria.

A subsurface investigation report for the CGSC building will not be available prior to the 35% submittal. Preliminary design and cost estimates for the CGSC foundation system are based on the foundation system used at adjacent Combined Arms Research Library (CARL) and it's subsurface investigation report. The final foundation system will be based on recommendations contained in the "Subsurface Investigation Report" specifically for the CGSC project.

5.4.9.1 Design Parameters

Preliminary foundation design will be based on the following design parameters:

Minimum depth of foundation to be in accordance with per TI 809-01.

356mm (14") Auger cast pile foundation axial load capacity = 356kN (80 kips). Drilled piers to bear on South bend Limestone at approximate elevation 233.17M (765 ft.).

Drilled pier design foundation bearing pressure (net) of 5746 kPa (120,000 psf) and design skin friction of 3735 kPa (78,000 psf). Drilled piers to bear on South bend Limestone at approximate elevation 233.17M (765 ft.).

5.4.9.2 Structural Stoops at Exterior Doorways

Structural stoops will be provided at exterior doorways directly adjacent to exterior concrete slabs. Stoops will have foundations extending down to frost depth and will be rigidly attached to building foundation walls. Stoops will have a layer of 300mm of uncompacted fill placed directly beneath the stoop slab. Stoop slabs will be flush with the interior floor slab at the threshold and

will slope away from the building at a (1/4" per foot) slope minimum.

5.4.9.3 Concrete Floor Slab Finishes

Concrete floor slab finishes will be as specified in Specification 03300.

5.4.9.4 Exterior Equipment Pads

Exterior mechanical or electrical equipment will be installed on concrete pads. The pads will be a minimum of 200mm thick and will be reinforced with at least the minimum temperature reinforcement required. The pads will be sized 300mm larger all around than the piece of equipment furnished and all edges of the pad shall be chamfered. Design of exterior pads will be coordinated with the mechanical and electrical system designs.

5.5 STRUCTURAL MATERIALS DESIGN DATA

Materials for structural elements will be as indicated herein or on the drawings.

5.5.1 Reinforced Concrete

5.5.1.1 Design

Reinforced concrete will be designed in accordance with TI-809-02, TI 809-04, and ACI 318, and related current ACI publications that are applicable to the design. All concrete elements, including slabs-on-grade, will be reinforced with temperature and shrinkage reinforcement as recommended by ACI as a minimum.

5.5.1.2 Concrete Strength

The minimum required 28-day compressive strength (f'c) or flexural strength of the concrete will be as follows:

Location	F'c (Min.) MPa (PSI)	Unit Weight kg/M^3 (PCF)
Foundations	27.6 (4000)	2403 (150)
Piers & Auger Piles	27.6 (4000)	2403 (150)
Grade Beams	27.6 (4000)	2403 (150)
Topping Slab on Precast Hollow Core Slabs	20.7 (3000)	2403 (150)
Structure (Slabs, Beams, Walls, Columns,etc.)	27.6 (4000)	2403 (150)
Slab on Metal Deck	25.0 (3626)	1842 (115)

For concrete that is to be installed with exterior exposure, air-entrainment, producing a total air content in the concrete between 4-1/2 and 6 percent by volume, will be required.

5.5.1.3 Reinforcing Steel

Reinforcing bars (deformed) used in concrete design will be ASTM A615M, Grade 420 (Fy=420 MPa (60 ksi)). Reinforcing bars (deformed) required to be welded will be ASTM A706M, Grade 420. The minimum bar size will be a No. 13 bar except for stirrups and ties which may be No. 10 bar per ACI. Nosing bars will not be used in exterior concrete stairs.

Welded Wire Fabric will be ASTM A185 with a minimum Fy=420 MPa (60 ksi).

5.5.1.4 Concrete Joints

Control joints and contraction joints will be located to reduce concrete cracking to a minimum. All exposed concrete joints will be sealed with appropriate joint sealant.

5.5.2 Concrete Masonry

5.5.2.1 Design

Masonry design will be in accordance with TI 809-02, TM 5-809-3/AFM 88-3, Chp 3, TI 809-04. U.S Army Corps of Engineers "Typical Masonry Details" will be used. Reinforcement will be sufficient to satisfy the calculated requirements for strength, shrinkage crack control, and seismic design. In no case will reinforcement be less than the minimum seismic reinforcement required by TM 5-809-3/AFM 88-3 Chp 3. Connections between walls and the structural steel frames will be designed to allow frame movement with minimum influence on adjoining walls. Concrete masonry crack control measures comprised of masonry control joint, joint reinforcement, and bond beams will be incorporated in the design of concrete masonry walls and partitions. Masonry control joints (MCJ) will be located at spacing no greater than the maximums recommended in TM 5-809-3/AFM 88-3, Chp 3. Masonry control joints will not be placed closer than 600mm from openings.

5.5.2.2 Concrete Masonry Material Strengths

Masonry materials will meet the following minimum requirements:

Masonry will have a specified prism strength f'm = 9.3 MPa (1350 psi) at 28 days.

Hollow concrete masonry units will conform to ASTM C90, Type I, Grade N and will have a minimum compressive strength of 13.79 MPa (2000 psi) on the net area at 28 days.

Mortar will be Type S and shall conform to ASTM C270, with a minimum compressive strength of 12.41 MPa (1800 psi) at 28 days.

Grout will have a specified minimum compressive strength (f'c) of 13.8 Mpa (2000 psi) at 28 days.

5.5.2.3 Concrete Masonry Reinforcing

Reinforcing bars (deformed) used in masonry design will be ASTM A615M, Grade 420 (Fy=420 MPa (60 ksi)). Reinforcing bars (deformed) required to be welded will be ASTM A706M, Grade 420. The minimum bar size will be a No. 13 bar.

5.5.3 Structural Steel

5.5.3.1 Design

Structural steel will be designed in accordance with TI 809-02, TI 809-04, and current AISC ASD Specifications. Welding will comply with American Welding Society (AWS) AWS D1.1, "Structural Welding Code- Steel". Steel joists will be designed in accordance with Steel Joist Institute (SJI) specifications.

5.5.3.2 Structural Steel Materials

Structural steel materials will meet the following minimum requirements:

Type	ASTM	Grade	Fy Min.
Structural Wide Flange Beams & Columns	A992 or A572M		345 MPa (50 ksi)
Structural Tees, Channels & Angles	A572M	---------	345 MPa (50 ksi)
Structural Plates	A572M	---------	345 MPa (50 ksi)
Structural Steel Pipe	A 53	B, Type E or S	241 MPa (35 ksi)
Structural Steel Tubing	A500	B	317 MPa (46 ksi)
High Strength Structural Bolts	A325M	---------	558 MPa (81 ksi)
Structural Anchor Bolts	A325	---------	558 MPa (81 ksi)
	A307	---------	241 MPa (35 ksi)
Welding Rods (Structural Steel)	------	E70XX	Fu=483 MPa (70 ksi)
Welding Rods (Steel Decking)	------	E60XX	Fu=414 MPa (60 ksi)

5.5.4 Steel Decking

5.5.4.1 Design

The design and selection of steel deck will be in accordance with the provisions of the Steel Deck Institute (SDI) Design Manual. Minimum required section properties of deck sections will be as specified or indicated on the drawings. Where the steel deck is designed to function as a shear diaphragm, the design will be in accordance with the provisions of the Steel Deck Institute (SDI) Diaphragm Design Manual and TM 5-809-10/AFM 88-3, Chp. 13. Steel decking materials will meet the following minimum requirements:

5.5.4.2 Steel Decking Material

Steel Roof Deck (Wide Rib)	Fy = 228 MPa (33 ksi) minimum
Steel Composite Floor Deck	Fy = 276 Mpa (40 ksi) minimum

5.5.5 Cold-Formed Metal Framing (CFMF)

Cold-formed metal framing (CFMF) will be designed in accordance with TI 809-07.

5.6 DESCRIPTION OF MISC./UNUSUAL DESIGN FEATURES

5.6.1 Vibration Producing Elements

All vibration producing mechanical, electrical, or other equipment will be mounted in manner as to prevent the transfer of vibrations to adjacent parts or areas of the building. If necessary for any large vibration producing equipment installed within the facility on the ground level, the equipment will be supported on individual isolated foundations. The isolated foundation will be separated from the building slab by a continuous 19mm expansion joint.

5.6.2 Deflection and Drift Limits

Deflections of structural member will not be greater than allowed by applicable material standards (ACI, AISC, etc.). Deflection limits are needed to restrict damage to ceilings, partitions, and other fragile nonstructural elements. Therefore, the deflection over span length (l) will not exceed that permitted by Table 1-4 of TI 809-02.

Drift limits applicable to earthquake loading are provided in Table 6-1 of TI 809-04.

5.7 LIST OF CRITERIA NEEDED TO CONTINUE AND COMPLETE FINAL DESIGN

5.7.1 "Final Foundation Analysis" Report (Geotechnical report)

The final foundation system will be based on recommendations contained in the "Final Foundation Analysis" report.

5.8 STRUCTURAL COMPUTATIONS

Structural computations will be bound under a separate cover called: 35% Design Structural Calculations. Volumes 1 through 3.

PART 6 - MECHANICAL

6.1 APPLICABLE CRITERIA

AFM 88-3, Chapter 13	Seismic Design Guidelines for Essential Buildings
AFM 88-4, Chapter 5	Gas Distribution
AFM 88-8, Chapter 4	Plumbing, November 1983
ASHRAE Publication 62	Ventilation Rates, 1989
ASHRAE 62-1989	Ventilation for Acceptable Indoor Air Quality
ASHRAE 15-1992	Safety Code for Mechanical Refrigeration
AFM 88-4	Data Processing Facility Design and Const., 1986
AFM 88-29	Engineering Weather Data, July 1978
ASHRAE	Standard 90.1-1989 Energy Efficiency Design of New Buildings.

Current ASHRAE Guide and Data Texts

ETL 83-1	Design of Control Systems for HVAC Systems
ETL 83-7, Jan 1990	Plumbing, AFM 88-8, Chapter 4
ETL 83-9	Insulation
ETL 86-16	Direct Digital Control Heating, Ventilation and Air Conditioning Systems
ETL 94-4	Energy Use Criteria for Facilities in the Military Construction Program
ETL 94-2	Utility Meters in New and Renovated Facilities
ETL 83-9	Insulation
ETL 87-1	Lead Ban Requirements of Drinking Water
ETL 90-10	Commissioning of Heating, Ventilating, and Air Conditioning (HVAC) Systems
ETL 93-5	Fire Protection Engineering Criteria Electronic Equipment Installation
ETL 91-7	Chlorofluorocarbon (CFC) Limitation in Heating, Ventilating and Air Conditioning (HVAC) Systems
ETL 1110-3-427	Radon Reduction in New Construction

National Fire Protection NFPA 13, 14, 30, 54, 75,101, 90A, 90B, 24,72 Association Criteria

MIL-HDBK-1008C (1997)	Fire Protection for Facilities, Engineering, Design, and Construction, 1997
MIL-HDBK-1190	Facility Planning and Design Guide, 1 September 1987
National Plumbing Code	Current Issue
Uniform Mechanical Code	Current Issue
Uniform Fire Code	Current Issue
FCCC & HR	Foundation for Cross-Connection Control and Hydraulic Research
SMACNA	Seismic Restraint Manual For Mechanical System
Project Booklet (PB)	Criteria For United States Army Space Command Headquarters Facility

6.2 HEATING, VENTILATING, AND AIR CONDITIONING (HVAC) SYSTEMS

6.2.1 Design Conditions

6.2.1.1 United States Army Command and General Staff College Facility shall be designed and built to the highest energy conservation and energy analysis criteria.

6.2.1.2 Outdoor Design Conditions (Reference TM5-785):

	Summer (2.5%)	Winter (97.5%)
Temperature	33.9°C DB 24.4°C WB	-16.1°C
Sherman AAF Altitude	235 m	
Sherman AAF Latitude	39 Deg N	

6.2.1.3 Indoor Design Conditions:

	Temperature	Humidity
Classroom/Lab Area	18 °C to 24°C	30% to 50% RH
Offices/Conf. Rooms	23.9 °C ± 2.2°C	35% to 60%
UPS	25.6°C (Summer) 18.3°C (Winter)	0% to 90% RH
Battery Room	25°C (Summer) 25°C (Winter)	0% to 90% RH
Mechanical Rooms Electrical Rooms	36°C (Summer) 10°C (Winter)	0% to 90% RH

6.2.1.4 Hours of Operation

Normal operation is 8 hours a day, 5 days a week except the SCIF area, which will be operational 24 hours per day, 7 days per week.

6.2.1.5 RSI Values Thermal Conductance

Roof .31 W (M^3-K)
Walls .27 W (M^3-K)

6.2.1.6 Ventilation Rates:

ASHRAE 62-1989
People 9.4 L/S
Rest Rooms 23.6 L/S per urinal/water closet
Boiler Room 10 air changes/hour
Corridors 2.5 L/S /m^2

6.2.1.7 Energy Conservation

A computer energy simulation analysis was performed in accordance with Kansas City AEIM for Command and General Staff College, Chapter 10, Section 2.1.1 “Life Cycle Cost (LCC)

Analysis". Four HVAC alternatives for the Trane Trace 700 program were considered. Life cycle cost of alternative systems were calculated as well as Design Energy Usage (DEU); and Total Design Energy Usage (TDEU) to be conducted per TI800-01. The LCC and energy budget figure report will be submitted separately before 35% submittal.

6.2.1.8 Design Energy Budget

The (TDEU) Design Energy Target for this facility is 40 KBtu/ft5/Yr ($45x10^7$J/m2/Yr) based on Region 7. The energy budget for this project was based upon occupied operating hours of 10 hours/day, 5 days/ week. Energy budget calculations were based on these operating times even though actual operating times may differ. The (DEU) Design Energy Usage will be determined later.

6.2.2 Air Side Design

The classroom area of this facility will be heated and cooled using a water source heat pump system. The heat pump condensing water will be coupled with a cooling tower/boiler loop. The air side of the heat pump system will be ducted overhead to classroom areas. This system will handle building loads such as lighting, people loads, building envelope loads and process "equipment" in the classroom only. The classroom communication/video closets will be provided with a dedicated water source heat pump system.

Outdoor air will be provided using heat pump units serving as 100% makeup air units located in the mechanical rooms. Outdoor air will be drawn into these units through ductwork connected to exterior wall mounted louvers in the Mechanical rooms. These units will incorporate a hot gas reheat option that will operate in a dehumidification mode during times of the year where there is high humidity outside. During times of low humidity, as in the winter months, duct mounted humidifiers will provide moisture to the makeup air. The makeup air units will discharge 78°F to each classroom. This air will be introducted at the return air of the dedicated classroom WSHP. Air will be relieved from the classroom to the plenum above the corridor ceiling. The relief air will be drawn to an exhaust fan located in the local mechanical room.

There will be WSHP makeup air units in the mechanical rooms for each building sector. Each unit will provide the required outdoor air capacity for that sector.

Each makeup air heat pump will have a pre-heat coil to temper the 100% outdoor air drawn into the unit before going through the heat pump refrigeration cooling/heating coil. In all units, the pre-heat coil will be part of an energy recovery water loop coupled with the primary building relief fans. The energy recovery, or "run-around" loops will contain a 50% ethylene glycol solution, two 100% capacity circulating pumps, expansion tank, and air separator.

6.2.3 Air Side Design (Office and Administration Area)

The Office/Administration area of this facility will be heated and cooled using a water source heat pump system. The heat pump condensing unit will be coupled with a cooling tower boiler loop. The air side of the heat pump system will be ducted overhead to Office/Administration areas. This system will handle building loads such as lighting, people loads, building envelope loads and process “equipment” in the area.

Outdoor air will be provided using heat pump units serving as 100% makeup air units located in the mechanical rooms. Outdoor air will be drawn into these units through ductwork connected to exterior wall mounted louvers in the Mechanical rooms. These units will incorporate a hot gas reheat option that will operate in a dehumidification mode during times of the year where there is high humidity outside. During times of low humidity, as in the winter months, duct mounted humidifiers will provide moisture to the makeup air. The makeup air units will discharge 78°F to each area, at the rate of 9.4L/S per person this air will be introducted at the return air of the WSHP. Air will be relieved to the plenum above the corridor ceiling. The relief air will be drawn to an exhaust fan located in the local mechanical room.

There will be WSHP makeup air units in the mechanical rooms, for each building sector. Each unit will provide the required outdoor air capacity for that sector.

Each makeup air heat pump will have a pre-heat coil to temper the 100% outdoor air drawn into the unit before going through the heat pump refrigeration cooling/heating coil. In all units, the pre-heat coil will be part of an energy recovery water loop coupled with the primary building relief fans. The energy recovery, or “run-around” loops will contain a 50% ethylene glycol solution, two 100% capacity circulating pumps, expansion tank, and air separator.

6.2.4 Authoritum Area

The authoritum area will be heated and cooled using a chilled and hot water heating air handling unit. The chilled and heating water will be generated using modular water source heat pump chiller/boiler units. These units will generate either (140°) 60°C hot water or (45°) 7.2°C chilled water. A (4) four pipe heating/chilled water loop. The heating and chilled water loop will be in the authoritum mechanical room, each loop will consist of two 100% capacity circulating pumps, expansion tank, air separator, chemical treatment and make up water supply. The condenser side of the modulator chiller/boiler unit will connect to the WSHP condenser loop. A two position diverting valve will be provided on each modulator unit. This will transfer to the heating or chilled water loop as determined by the temperature controller.

Air to the authoritum will be provided by a constant volume hot/chilled water air handling unit. Air will be introducted thru a low velocity duct system to minimize the noise level. Due to the high occupant load, the unit will be 100% outside air at full occupancy. Based on this high outside air

requirement a heat wheel (latent & sensible capacity) energy recovery unit will be provided. This unit will contain variable speed drive supply and return fans. A CO2 sensor will be provided in the return air stream from the authoritum. Modulating dampers will be provided to either return the air to AHU or to the ERU (energy recovery unit), as needed to maintain a max of 700 ppm CO2 level.

6.2.5 Lecture Hall

The Lecture Hall will be heated and cooled by a water source heat pump located in the local mechanical room. The outside air will be provided from a heat wheel energy recovery unit located in the west end mechanical room. The Lecture Hall WSHP will either draw return air from the space or gain outside air from the ERU based on the room CO2 level.

6.2.6 Kitchen Area

The kitchen exhaust will be drawn through hoods located over the cooking areas and over to wall mounted exhaust fans. Makeup air for the kitchen will be provided by water source heat pump units located in the main mechanical room. The makeup air will be discharged from the kitchen exhaust hoods into the cooking areas at 60 to 80% of the exhaust capacity. The remaining exhaust air will be pulled from the dining area. A single exhaust fan and makeup air handling unit will serve each kitchen hood to allow for kitchen personnel to turn off any kitchen hood that is not required to be running.

The dining portion will be served by ducted water source heat pumps located above the ceiling. Outside air will be provided from dedicated water source heat pump make up air units.

Air will be exhausted from the building in all locations required by code such as toilet rooms, janitor's closets, locker rooms, and kitchens. The kitchen will have dedicated hood exhaust systems that will not combine with the primary building exhaust. The primary exhaust system will consist of two roof centrifugal exhaust fans located on the roof above each main toilet area. Toilet areas will be provided with roof mounted exhaust fans.

6.2.7 Condenser Water System

The condenser water system for this facility will incorporate the principle of a primary/secondary system. The building load will be tied into the secondary loop. Two closed circuit cooling towers with fins provided on the condenser coils for dry coil cooling will be provided on the second level roof. Two boilers each sized for 70% of the loop heating load will be provided.

The primary loop system will be provided with two variable speed drive pumps (each sized for 100% of the load). The primary pumping loop will circulate the condensing water through the cooling tower, boilers and mains through the building. This loop will be pressure dependant therefore the secondary loop power required will be proportional to the building unbalanced

load which translates into substantial energy saving. One condenser water pump will be operating and one pump will be on standby.

Four cooling towers are provided for condenser water cooling. Condenser water circulates through four cooling towers each sized for 25% of the total cooling load. Part load conditions are provided by incorporation of variable speed drives in the cooling tower fan motors. Fins are provided for dry cooling. The sump can be drained for winter operation.

A spray pit (sump) is provided on each tower. This sump will have an automatic filtering system to collect suspended solids from the condenser water system.

An automatic water treatment system is provided to maintain the proper chemical concentration of the condenser water spray pump system.

6.2.7.1 Heating Plant (Condenser Loop)

Two natural gas fired forced draft boilers will be installed in the third floor mechanical equipment room. One boiler will be primary and the other will be a standby. Natural gas will be the primary fuel source. A thermostatically controlled louvered damper and supply fan will provide summer ventilation for the boiler room. Boiler combustion air will be tempered utilizing a make up air unit interlocked with operating boiler.

6.2.7.2 Central Heat Plant Location

The central heating plant equipment will be located in the main mechanical room on the third floor of the Building. Enough exterior wall space shall be provided to allow for air intake and exhaust to occur without causing short-circuiting of the supply and exhaust air.

All floor-mounted equipment will be located on concrete housekeeping pads.

The secondary condenser water loop will be constant volume. This will circulate the condensing water through the heat pumps. 16 zones will be provided. Each zone will consist of two 100% capacity zone pumps (constant volume) located in the mechanical rooms at each sector (4 mech rooms per floor). Each zone will recirculate its condenser water as long as the condenser supply temperature is between 10°C and 32.2°C. When this temperature limit is exceeded “above or below” the condenser return water will relieve into the primary loop return allowing only enough primary supply to maintain the loop temp required.
The boilers or cooling towers will be cycled as necessary to maintain the secondary loop between 10°C and 32°C.

6.3 SMOKE EVACUATION SYSTEM

A smoke evacuation system will be provided in the Great Hall. The system will have two roof mounted supply fans which will duct down in chases to above Level 2 ceiling to supply air to the lowest level. A roof mounted exhaust fan with exhaust ductwork and grilles at the 4th Level will exhaust the smoke. Exhaust system will be started by either a manual switch located at Level 2 or smoke detectors at Level 4 ceiling.

6.4 SENSITIVE COMPARTMENTED INFORMATION FACILITIES (SCIF)

Secure Classrooms Level 1: The SCIF areas will be served by equipment that will operate 24 hours daily and will be capable of satisfying the personnel and equipment requirements of the user. Water source heat pumps will be provided as the cooling and heating system. The system(s) selected will be capable of providing adequate temperature control and air movement for loads as they change during the occupied periods. Enough zoned control will be provided to ensure comfort and equipment requirements are being met in different portions of the space. Humidity control has not been requested. A humidifier will be provided as part of the WSHP units if determined necessary during the design process an economizer cycle will not be allowed.

6.5 STAIRWELLS

Each stairwell will be heated and cooled by ceiling recessed WSHP unit to maintain 21°C. The unit will be external to stairwell and ducted to sidewall supply into stairwell.

6.6 ELECTRICAL AND COMMUNICATION ROOMS

To ensure space temperatures do not exceed 29.4°C, the Electrical and Communications Rooms and Closets will be provided with water source heat pumps recirculation only.

6.7 ENTRY CONTROL FACILITIES (GUARD HOUSES)

Entry Control Facilities will be provided with roof mounted packaged heating and cooling units with wall-mounted thermostat. Units shall be all electric.

6.8 RESTROOMS

Men and women restrooms will be conditioned and exhausted. The exhaust rate shall be 23.6 L/S per water closet/urinal (ASHRAE 62-1989). These areas will be slightly negative from surrounding areas such that make up air will be drawn from adjacent spaces via door undercuts.

6.9 SERVICE, MAINTENANCE, AND REPAIR

Provisions shall be made to allow for the building's main equipment to be serviced, maintained, or repaired with minimal interruptions to vital building functions. The condenser water secondary loop, primary pumps, are all equipped with back-ups, with automatic switch over and alarm feature. Similarly, each of the two cooling towers is sized for 60% capacity so that one cooling tower can handle most of the equipment loads in case of failure of any major components of the other unit.

6.10 PLUMBING

6.10.1 The plumbing design will be in accordance with AFM 88-4, Chapter 4 and the National Standard Plumbing Code. The plumbing design will provide domestic hot and cold water to the various plumbing fixtures and water makeup to the various hydronic type environmental control systems (i.e., expansion tanks, boilers, etc.) Backflow preventers will be provided on all makeup water systems. A water meter will be provided inside the building at the water service entrance. Water at the site will be categorized in accordance with AFM 88-4 and the pipe materials for the domestic hot and cold water systems selected accordingly. The plumbing system for the facility shall include fixtures, drains, natural gas water heaters, domestic water piping, sanitary waste and vent piping, storm drainage piping, natural gas piping and pumps. The A/E shall verify sufficient flow based on NSPC. Design calculations on water and sewer line capacities shall be submitted by the A/E with the 35% package.

Domestic Hot Water: Domestic hot water will be provided to the core area of the building by a centralized gas-fired water heater located in the Mechanical Room. Domestic hot water may be provided to smaller toilet areas at remote locations in the building by electric water heaters located in the janitor's closets, mechanical fan rooms, etc. The domestic hot water heater will be sized based on a 49°C storage temperature. A domestic hot-water circulating pump will be provided on all water heaters where the time required for hot water to reach the farthest fixture exceeds 10 seconds.

6.10.2 Plumbing Fixtures

Plumbing fixtures will be water conserving type. All plumbing areas will contain the required quantity of fixtures which are accessible to the physically challenged. Occupancy will be based on 70% men and 30% women for personnel in building. The Auditorium and Lecture Hall will be 50% male to female ratio. Water closets and urinals will be wall hung, vitreous china with electronic sensor flush valves and floor carrier. Lavatories will be molded resin, grid drain outlet, offset p-trap, temperature regulating faucet, stops and insulated supply and drain. All flush valves and lavatory faucets will be provided with electric sensors. Service sinks will be floor mounted Terrazzo with wall mounted faucet with vacuum breaker, bucket hook, wall brace, mop hanger, wall guard and trap. Water coolers will be dual height wall hung electric.

6.10.3 Building Domestic Water

Domestic cold and hot water piping will be insulated Type-L copper, above grade. Below grade piping will be Type-K soft drawn. Approved backflow preventers will be provided for make-up water service to HVAC equipment. An approved backflow preventer will be provided on the domestic water supply to the building. Water piping will be sized so that velocities will not exceed 1.8 m/s. All major branches will have isolation valves to facilitate maintenance.

6.10.4 Building Waste and Vent System

The waste system will be HUB Type cast iron pipe and fittings below grade. Above grade waste and vent will be no-HUB cast iron pipe and fittings. Waste and soil lines will drain by gravity to the site sanitary system. Vents through the roof will be increased two pipe sizes for frost closure and heat traced and insulated for 5 meters from the roof to eliminate condensate. Condensate rim floor drains with bucket strainers will be provided for HVAC equipment condensate drains.

Toilet Rooms: Water closets and lavatories, some of which are accessible to the handicapped, will be provided in the main toilet areas.

Break Rooms: Domestic hot and cold water will be provided to sinks in break areas.

Janitor Closets: Hot and cold water will be provided to floor type mop sinks in janitor closets.

Electric Water Coolers: Bi-level, mechanically refrigerated electric water coolers will be provided, part of which will be suitable for use by the physically disabled and part of which will be standard height. Water coolers will be located in close proximity to the main toilet areas as shown on drawings.

Emergency Showers: Emergency eye and face wash, will be provided for mechanical rooms.

Wall Hydrants: Wall hydrants will be provided in the exterior walls and wall faucets will be located in Mechanical Rooms.

Floor Drains: Floor drains will be provided in all mechanical rooms. Each toilet area shall have floor drains.

Lawn Irrigation: A lawn irrigation system will be provided as specified in the environmental section of the project book.

Roof Drainage System: Roof drains will be provided at the low points of the roof. Storm water will be routed through interior downspouts and discharged into the storm sewer system. Roof drains will be designed for a rainfall rate of four inches per hour in accordance with the National Standard Plumbing code. To make the most efficient use of ceiling space, drain lines will be sloped at 10 mm per meter minimum.

6.10.5 Storm Drain System (Building)

The building will be provided with flat roof, roof drains and overflow roof drains. Collection of rain water to be discharged to the site storm water system will be through cast iron roof drain piping system.

6.10.5.1 Energy Source

Natural Gas: The equipment that will require natural gas are the kitchen equipment hot water boilers and the domestic hot water heaters. The user will provide the capacity, pressure, and heating value of the natural gas at this site. All natural gas usage for the building will be monitored.

Electricity: The mechanical equipment which will require the greatest electrical energy will be the cooling towers, modular chillers (Auditorium), centrifugal pumps, air handler (Auditorium), and water source heat pump units.

Seismic Requirements: The seismic design requirements for mechanical piping and equipment will be determined based on TI809-04.

6.11 MECHANICAL, PLUMBING COMPUTATIONS

Mechanical, Plumbing Computations are bound under a separate cover called: 35% Design Mechanical Calculations. Volume 1.

PART 7 - FIRE AND LIFE SAFETY

7.1 SUMMARY

This design covers the protection of a roughly 34,300 sm, 4-level building containing Adult education and assembly functions

These facilities were designed to meet the requirements of MIL-HDBK-1008C. Building construction materials and limitations meet requirements of the 1997 UBC. Egress and other fire and life safety requirements are based on NFPA-101 and other associated NFPA standards. A combination standpipe/sprinklers system and a fire alarm and detection system will protect the facility. The facility will be completely covered by automatic fire sprinklers. The fire alarm and detection system will be able to notify the base fire department of fire or trouble.

An atrium connects the elevator lobbies of the 1st through 4th floors and must be protected per requirements of NFPA-101 and 92B. This includes a smoke evacuation system. A mini-atrium meeting requirements of NFPA-101 will connect the 2nd through 4th floors in the class room area

7.2 APPLICABLE CRITERIA

The following references have been used in the preparation of the design:

MIL-HDBK-1008C	Fire Protection for Facilities, Engineering, Design and Construction, (10 JUN 1997)
UBC-97	Uniform Building Code, 1997
UFAS	Uniform Federal Accessibility Standard
ADAAG	American with Disabilities Act Accessibility Guidelines
ASTM E84	Surface burning Characteristics of Building Materials
NFPA 10	Portable Fire Extinguishers, 1998
NFPA 13	Standard for the Installation of Sprinkler Systems, 1999
NFPA 14	Installation of Standpipe and Hose Systems, 2000
NFPA 20	Installation of Centrifugal Fire Pumps, 1999
NFPA 30	Flammable and Combustible Liquids Code, 2000
NFPA 37	Stationary Combustion Engines, 1998
NFPA 70	National Electric Code, 2002
NFPA 72	National Fire Alarm Code, 1999
NFPA 90a	Standard for the Installation of Air Conditioning and Ventilating Systems, 1999
NFPA 90b	Standard for the Installation of Warm Air Heating and Air Conditioning Systems, 1999
NFPA 101	Life Safety Code, 2000
UL555	Standard for Safety Fire Dampers
UL555S	Standard for Safety Leakage Rated Dampers for Use in Smoke Control Systems.

7.3 CONSTRUCTION AND OCCUPANCY

7.3.1 Occupancy

The primary occupancy of the buildings in this project and any sub-occupancy as defined by the codes are as follows:

OCCUPANCY	NFPA-101	97 UBC
Primary Occupancy:	New Business (6.1.11)	B (304.1)
Sub-occupancies		
Assembly *1	New Assembly (6.1.2)	A-1 (303.1.1)
Assembly *2	New Assembly (6.1.2)	A-2.1 (303.1.1)

*1 Auditorium, > 1000 occupants w/ stage
*2 Entry/ Auditorium Foyer

7.3.2 Area Limitations

The type construction and limitations on them as defined by the 97 UBC are as follows:

Criteria	Allowable Area	Height
Construction Type:	Type II-FR	
Building (UBC Table 5-B):	36,468 sm	4 stories
Business (Sprinkler & 2 side access increase)	22,241 sm	12 stories
A-1 (Sprinkler & 3 side access increase)	22,222 sm	4 stories
A-2.1 (Sprinkler & 3 side access increase)	11,111 sm	4 stories

Refer to Appendix B; Building Code Analysis

7.3.3 Fire Resistive Rating

Refer to Appendix B; Building Code Analysis

7.3.4 Building Separation and Exposure Protection

(Incomplete at this submittal)

7.3.5 Interior Fire Separation and Barriers

7.3.5.1 Occupancy Separations: Occupancy separations is required between adjacent occupancies as follows per UBC Table 3-B.

Occupancy/Occupancy	Wall Rating
A-1 / B	3 hr
A-2.1 / B	1 hr

7.3.5.2 Area Separations: As required, area separation will be 4 hour fire resistive construction with 3 hour rated opening protection. (*Need for area separation analysis is incomplete).*

7.3.5.3 Exit and Shaft Enclosure and Separation

7.3.5.3.1 Stairs: Stair towers are exits as defined by NFPA-101 sections 7.1.3.2 and will be enclosed by 2 hour fire-rated enclosures where they penetrate 4 floors and 1 hour where they penetrate 3 or less floors. They shall meet the requirements of NFPA-101 sections 7.1.3, 8.2, 8.3, and 9.4

7.3.5.3.2 Shafts: Each floor/ceiling assembly will be a 2-hour-rated fire smoke barrier per NFPA-101 8.2.4. Shafts penetrating floors will be constructed with 2-hour fire rating per 8.2.5.4.a. Ducts that penetrate only a single floor to serve the adjacent floor will only have a horizontal 2-hour fire damper at the floor (NFPA-90A 3-3.4.1 Exception). Combination fire dampers will be rated for 1½-hour per UL555S.

7.3.5.4 Other Separation

7.3.5.4.1 Exit Access Corridors: Exit access corridors in the Business Occupancies will be non combustible but not be rated per NFPA-101 38.3.6-Exceptions 2 and 3. Exit access from assembly occupancies shall be *(incomplete this submittal)*

7.3.5.4.2 Atrium: The Atrium will be separated from the rest of the building by a 1 hour smoke barrier as required by NFPA-101 section 8.2.5.6. Barriers will run from outside wall to outside wall. The barrier will have automatic closing doors with a 20-minute fire rating minimum. In some locations the doors will have higher ratings. Wall penetrations such as ducts and air transfer openings will have actuated smoke dampers meeting UL555S and will be closed by the building's fire alarm system.

7.3.5.4.3 Mechanical Rooms: Mechanical rooms on all floors will be enclosed with 1-hour rated wall construction. These are not required for fire protection but are provided for sound attenuation. The added fire protection is a bonus.

7.4 INTERIOR FINISHES *(INCOMPLETE THIS SUBMITTAL)*

7.5 MEANS OF EGRESS

7.5.1 Occupant Load

Occupant Load Factors: (NFPA 101, 7.3.1.2)

Building	Occupancy Classification	Exits SM/person
Office Area	Business	9.3 Gross
Class Rm Area	Business	9.3 Gross
Auditorium	Assembly	Fixed Seats
Foyer/ Entry	Assembly	0.65 Net

Conference Rms	Assembly	1.4 Net
Cafeteria	Assembly	1.4 Net

(Occupancy Calculation not submitted this submittal)

7.5.2 Egress Capacity Factors the egress component capacity shall be based on the following per NFPA 101, 7.3.3.1:

7.5.2.1 Stairways: 0.8 cm/person
7.5.2.2 Level Components and Ramps: 0.5 cm/person
7.5.2.3 Minimum Width of Any Egress Components: 91cm (7.3.4)
7.5.2.4 *Exceptions to this are noted on 7.3.4 including doors at 81cm clear per 7.2.1.2.3
7.5.2.5 Minimum Width of Corridors and Passageways: 112cm (38.2.3.2)
7.5.2.6 See attached occupancy calculations for required and actual capacities. *(Not submitted this submittal)*

7.5.3 Occupant Load & Egress Capacity: (NFPA 101, 7.3.3.1)

7.5.3.1 Number of means of egress: The number of required number of means of egress required by NFPA-101 based on the calculated occupancies of each are of the buildings is as follows:

Incomplete. Not included this submittal

7.5.3.2 Travel Distance Limits: (NFPA 101, Table A-7.6.1)

	Maximum Allowed Travel Distances, Meters		
Occupancy	**Exit Dist.**	**Dead End Corr.**	**Common Path**
Business	91	15	30
Assembly	60	6.1 [1]	6.1

1. Dead end aisle, Dead end corridors not permitted

7.5.3.3 Discharge from Exits: Exit discharge is designed to meet requirements of NFPA 101, 38.2.7, 12.2.7, 7.7. Exit discharge directly to the outside of the building to a public way is (Incomplete). The remainder of the building exits through stair towers terminating on the first floor.
7.5.3.4 Illumination of Means of Egress: Exit shall be illuminated per NFPA 101, 7.8.
7.5.3.5 Emergency Lighting: Emergency lighting is required by NFPA 101 38.2.9.1(a). It will be provided in accordance with provisions of NFPA-101 7.9.
7.5.3.6 Exit Markings: Exit signage will be provided in accordance with NFPA-101 7.10.

7.5.4 Protection of Vertical Openings:

Vertical openings including exit stairs, elevator hoistways, and duct shafts will be protected in accordance with NFPA-101 8.2.5. A 1-hr minimum smoke barrier separating it from the rest of the building and a smoke evacuation system will protect the atrium.

7.5.5 Protection from Hazards:

Hazardous areas are protected by automatic fire sprinkler system meeting requirements of NFPA-101 38.3.2.1(b).

7.6 FIRE DETECTION AND ALARM SYSTEM

7.6.1 The fire alarm system will be designed in accordance with MIL-HDBK-1008C, NFPA 70.

7.6.1.1 The system will be the addressable with signal line circuit wiring (SLC) style 6, and notification appliance circuit wiring (NAC) style Z in accordance with MIL-HDBK-1008C

7.6.1.2 The Monaco M-2 Addressable Integrated Radio Transceiver and Fire Alarm Control Panel is required by the Fire Department to standardize their system on the post, and sole source justification will be required. All control panels will be located in the 2nd floor lobby per their instructions.

7.6.1.3 The primary means of initiation of the alarm will be by addressable pull stations at the exits and by addressable monitors at the flow switches on the sprinkler risers.

7.6.1.4 Photoelectric smoke detectors will be used to protect the fire alarm control panel; to initiate elevator recall in each lobby, machine room and elevator shaft; and to release electromagnetic door holders at smoke control doors.

7.6.1.5 Heat detectors will be used in the elevator machine rooms and top and bottom of the shafts to initiate elevator shut-down by shunt-trip circuit breakers.

7.6.1.6 Horn/strobe combination appliances and strobes will be located in corridors, in classrooms and in other normally occupied areas, except private offices and small shared offices. Electrical rooms, mechanical rooms, communication rooms, storage rooms and janitors' closets are not considered to be occupied spaces.

7.6.1.7 Strobes will be located as required by ADAAG and NFPA 72. Strobes will be provided in restrooms, at every other stairwell landing, in large conference rooms and in supplemental locations where horn/strobes are not required.

7.6.1.8 Tamper switches will be provided for sprinkler valves and PIV valve.

7.6.1.9 The smoke control system will operate upon water flow in the smoke compartment or upon manual switching at the Firefighters' Smoke Control Station. Status of the smoke control system will be displayed at this station.

7.6.1.10 The fire pump status will be monitored by the fire alarm system.

7.6.1.11 The auditorium and large lecture hall will receive pre-recorded or live voice evacuation announcements in the event of alarm.

7.6.1.12 Communication capability from the fire command center in the 2nd floor lobby will be provided to phone jacks throughout the building for firefighters' use.

7.6.2 The fire alarm system will be equipped with two 12V, 40Ah battery back-ups. Three remote power supply/booster panels will be located on each floor for NAC power and provided with gel-type battery back-up.

7.6.3 The AEIM requires power connection ahead of the service equipment. Since this is a double-ended power system, it is unclear at this time whether an automatic transfer switch will be required for fire alarm power.

7.7 FIRE EXTINGUISHING SYSTEMS

7.7.1 Combination Automatic Fire Sprinklers and Standpipe System

7.7.1.1 Standpipe System: A standpipe system is required in the main building by MIL-HDBK-1008C 6.4.1 and to use noted allowances and exceptions in the UBC and NFPA-101 codes. The systems will be an automatic-wet type. The standpipe systems will consist of risers in the stair towers with hose connections at the landing midway between floors and near the door on the first floor. The system will be designed to the requirements of MIL-HDBK 1008C, NFPA-13, and NFPA-14 for combined sprinkler and Class I standpipe systems. It will be seismically braced per NFPA-13. Hydraulic calculation for the fire sprinkler system will be formatted per NFPA 13.

7.7.1.2 Automatic Fire Sprinkler System: An automatic fire sprinkler system covering the entire building is required by MIL-HDBK-1008C section 6.1.2 based on the value of the facility. The design will conform to the requirements of MIL-HDBK-1008C, and all of NFPA-13 and 14 and will be seismically braced.

7.7.1.2.1 Automatic Fire Sprinkler Zoning: Each floor's area will be served by standpipes/riser floor control valve assemblies located in the stair tower. This will limit the area of sprinkler control zones to less than 4831sm (NFPA-13 4-2). All floor zones in the main building will be served from the standpipes in stair towers.

7.7.1.2.2 Sprinkler System Fire Hazard Classifications: Building area shall be classified as listed below (Mil-HDBK-1008C, Appendix B; NFPA 13 2-1)

Wet Sprinkler System, Light hazard (LH):
Office Areas
Dining Area
All other spaces not noted in other classifications.

Wet Sprinkler System, Ordinary Hazard Group 1 (OH1):
Kitchen Areas
Auditorium

Wet Sprinkler System, Ordinary Hazard Group 2 (OH2):
Mechanical spaces

7.7.1.2.3 Design Water Demand Requirements: Sprinkler systems serving the above listed areas shall be designed to the following standards: (Table 3, Mil-HDBK-1008C)

Occupancy Classification	Sprinklers Density, L/min./sm.	Area, sm.	Hose Allowance L/ min.	Duration of Supply Minutes
LH	4.07	280	946	45
OH1	6.11	280	1,892	60
OH2	8.15	280	1,892	75

7.7.1.2.4 System Details

Stair Towers: Stair towers, of non-combustible construction, will be sprinkled only at the top level and under the first floor landing per NFPA-13 5-13.3.
Shafts: Shafts shall be protected per NFPA-13 5-13.2
Elevator Hoistways: Elevator hoistways will be protected according to NFPA-13 5-13.6 and requirements of ASME A17.1.

7.7.1.2.5 Equipment and Components:

Sprinkler Heads: Sprinkler heads will be intermediate temperature, quick response type except in the rack storage coverage where they will be high temperature (141°C) standard response type unless noted otherwise. Up-right and pendant brass heads will be used in unfinished areas. Dry pendant type heads will be used in the wet systems where subject to freezing. Chrome plated recessed pendant type heads will be used in areas with drop ceiling.
Piping System: The systems will be designed for a maximum systems pressure of 17.2 bars. Piping will be schedule 40 black iron for smaller pipes and schedule 10 black iron for 3” and larger pipes. They will meet requirements of NFPA-13. All sectional and isolation valves will be OS&Y type with tamper switches. Water flow in any sprinkler

zone or flow in a standpipe will be annunciated through the fire alarm system per NFPA-13, NFPA-14, and NFPA-72. Sprinkler system drains shall be routed to an approved location per NFPA-13 and NFPA-14.

7.7.1.2.6 Hose Stations

Class 1 standpipe hose connections: 65mm hose connection valves will be provided on the standpipes per NFPA-14 2-8.

7.7.1.3 Fire Pump:

7.7.1.3.1 A fire pump is required to meet the fire sprinkler and standpipe system design flow and pressure requirements. See attached hydraulic calculations (Not Included this submittal). The fire pump will be located in a room at ground level with fire department access. Emergency generators will provide backup electric power for the fire pump. The fire pumps installation will comply with NFPA-20 requirements including the following:

7.7.1.3.2 **Fire Pump Type**: An electric 3784 lpm centrifugal split-case will be provided. It will generate ?? m of head.

7.7.1.3.3 **Flow Meter**: A flow meter will be provided to test pump capacity to 175% of rated flow (NFPA-20 2-14.2)

7.7.1.3.4 **Test Header**: A test header with 65mm hose valves to be provided per NFPA-20 Table 2-20.

7.7.1.3.5 **Relief Valve**: When required, pump discharge relief valve will be provided and piped to discharge outside the building.

7.7.1.3.6 **Jockey Pump:** An electric centrifugal jockey pump to maintain the systems at the pressure set point.

7.7.1.3.7 **Bypass Line:** A bypass line with a normally open valve will be provided to bypass the pump if the need arises.

7.7.1.3.8 **System Monitoring:** A flow and pressure switch will be monitored by the fire alarm system to notify authorities of system operation or low system pressure.

7.7.1.3.9 **Pump Power:** The electric motor on the pump will be powered from the domestic power feed and automatically switch to power from the emergency power generators.

7.7.1.3.10 **Pump Controls:** Pumps will be controlled per requirements of NFPA-20. Separate controls will be provided for the fire pump and jockey pump.

The Jockey Pump will cycle on and off to maintain the system between set point pressures.

7.7.1.4 Water Supply

The sprinkler system is designed based on fire flow test results. Test results were the following:

Location:	Ft Leavenworth, Hydrant #167
Date:	22 May, 2002
Preformed By:	Dave Johnson.

Static Pressure:	7.24 Bar (105 psig or 724 kpa)
Residual Pressure:	1.72 Bar (25 psig or 172 kpa)
Flow:	3,175 LPM (839 gpm or 82.9 lps)

The site is fed by two 300mm line

The domestic water systems will be protected by a double-check back-flow preventer on the Fire Protection feed main to the building before the pump suction inlet.

The flow test provided does not look as though it can provide the flow required to meet the NFPA-14 stand pipe requirements of roughly 4,732 lpm (1250 gpm) at 6.9 Bar (100 psig) discharge pressure at the hose valve. Options to reduce the maximum demand, provide onsite storage, or boost available supply will be reviewed as the design continues.

7.7.2 Fire Extinguishers

7.7.2.1 General: Portable fire extinguishers will be provided though out the facility. They will be spaced to be reached from any location in the building with a travel distance of 22.8m or less (NFPA-10 Table 3-2.1). 4.5kg multi-purpose 4A:60B:C extinguishers unless noted otherwise will be located in recessed cabinets in finished areas of the buildings and in surface mounted cabinets in unfinished spaces.

7.7.2.2 Kitchens: *Necessity of kitchen hood fire protection will evaluated as kitchen design progresses.*

7.8 FIRE DEPARTMENT ACCESS

Fire department pumper trucks will be provided with two points of connection to the building's sprinkler system per NFPA 14, 5-12.2. 3 to augment the fire pump's supply.

(Site Access information to be completed for future submittal)

7.9 SMOKE AND HEAT VENTING

Smoke and Heat venting is not required in this facility.

7.10 SMOKE MANAGEMENT SYSTEM

7.10.1 Atrium

General Design: An engineered smoke management system shall be provided for the atrium of the main building in accordance with NFPA-101 6-2.4.6 and NFPA-92B. The atrium encloses the space at the intersection of the three main building elements and is the main entrance to the building. The atrium will extend from the lowest level of the building to the roof. The smoke exhaust system shall be designed to maintain the smoke layer interface 1830mm above the highest balcony (the 4th floor). The design fire shall be a *????*kW steady fire (To be determined). Mass rate of smoke production shall be based on an axisymmetric plume. Adjacent spaces are separated from the atrium by a one-hour smoke barrier, therefore smoke management is not required in the communicating spaces. The maximum make-up supply velocity shall not exceed 1m/s. (Calculations not submitted the submittal).

7.10.1.1 System Description: (sizing incomplete) This system shall consist of one smoke evacuation fan rated at *XX,XXX* l/s, and make-up air fan rated at *XX,XXX* l/s. Both supply and exhaust fans shall be located *??????* floor mechanical equipment room. Intake and exhaust will be through the roof. Air distribution ductwork shall supply the make-up air at the first floor ceiling level.

7.10.1.2 System Control: The smoke evacuation system equipment shall be started and stopped by the Firefighter's Smoke Control System (FSCS) Panel. It will be located as directed by the Base Fire Department in the Main Entry Lobby, which is in the Atrium. It shall allow either manual or automatic activation of the system components. The system shall be automatically activated when the fire alarm system (FAS) senses flow to the atrium fire sprinkler system. When started, the FSCS shall cause all smoke dampers in the 1-hour smoke barrier on all levels to close and the smoke evacuations make-up and exhaust fans to start. These will continue to run until manually stopped at the FSCS panel. If fire is detected on one of the floors communicating with the Atrium, the smoke dampers on that floor will be closed. The fans will not be started and the other smoke dampers will remain open.

7.10.2 Stair Pressurization:

No stair pressurization system is required by NFPA-101.

7.11 MISCELLANEOUS

7.11.1 Emergency Generator:

A diesel powered emergency generator will be installed to provide backup power to critical systems including the fire pump and elevators. It will be installed per requirements of NFPA-37. Fuel for the generator will be stored in an aboveground *XX,XXX* liter double wall storage tank with inner leak monitoring system. It will be installed in accordance with applicable NFPA-30 requirements

7.11.2 Kitchen Hood Wet Chemical Fire Extinguishing System:

Necessity of kitchen hood fire protection will evaluated as kitchen design progresses

7.12 FIRE PUMP COMPUTATIONS

Fire Pump Computations are bound under a separate cover called: 35% Design Mechanical Calculations.

PART 8 - ELECTRICAL

8.1 OBJECTIVE

The objective of this project is to provide a new, state-of-the-art classroom/administrative facility that will provide training for the military throughout the country and meet the Command and General Staff College's (C&GSC) vision and budget.

The objective of the electrical design portion of the project is to insure compliance with standards, provide a safe, reliable, low maintenance system that will give long term, flexible and expandable service while conserving energy and presenting an aesthetically pleasing installation.

The classrooms are designed to meet Classroom XXI standards by providing the power and communications required for local learning as well as Video Teleconferencing (VTC) for distance learning. Special attention to the stringent lighting requirements of the classroom versus VTC functions will result in a unique lighting design that affords ample lighting for video conferencing and while eliminating glare that would interfere with video display terminal (VDT) use.

The following outline describes the concepts used in the overall project design.

8.2 CRITERIA

The below listed Codes and Standards will be used in the design of the project:

Name	Description
-	Kansas City District Instruction Manual
-	Fort Leavenworth Installation Design Guide
-	DOD Antiterrorism Standards for Buildings
-	TRADOC Classroom XXI Standards (Level 4)
-	Uniform Building Code
ANSI/IESNA RP-33-99	Lighting for Exterior Environments
ANSI/TIA/EIA-607	Commercial Building Grounding and Bonding Requirements for Telecommunications
DCID 1/21	Physical Security Standards for Sensitive Compartmented Information Facilities (SCIF)
DCID 1/21, Annex B	Intrusion Detection System (IDS)
DD Form 1391	Command and General Staff College, PN 51174
ER 1110-1-4	Metric Measurements in USACE Publication Media
ER 1110-1-8152	Professional Registration
ER 1110-1-8159	Engineering and Design, DrChecks
ER 1110-345-700	Design Analysis, Drawings and Specifications
ER 1110-345-723	Systems Commissioning Procedures
ER 25-345-1	Systems Operation and Maintenance Documentation
IEEE C2	National Electric Safety Code
MIL-HDBK 419A	Grounding, Bonding, and Shielding for Electronic Equipments and Facilities
MIL-HDBK-1008C	Fire Protection for Facilities, Engineering, Design, and Construction
NFPA 101	Life Safety Code
NFPA 70	National Electric Code
NFPA 72	National Fire Alarm Code
TI 800-01	Design Criteria

TI 809-04	Seismic Design for Buildings
TI 810-90	Elevator Systems
TI 811-12	Utility Monitoring and Control Systems
TI 811-16	Lighting Design
TL 1110-3-403	Electrical Power Systems for Nonlinear Loads
TL 1110-3-412	Transformer Application Guidance
TL 1110-3-432	Exit Signs
TL 1110-3-441	Electronic Ballasts for Fluorescent Lighting Fixtures
TL 1110-3-474	Cathodic Protection
TL 1110-3-491	Sustainable Design for Military Facilities
TL 1110-3-502	Telephone and Network Distribution System Design and Implementation Guide
TM 5-811-1	Electric Power Supply and Distribution
TM 5-811-14	Coordinated Power Systems Protection
TM 5-811-2	Electrical Design, Interior Electrical System (Incl C1)
TM 5-811-3	Electrical Design: Lightning and Static Electricity Protection
TM 5-811-7	Electrical Design, Cathodic Protection
TM 5-853-4	Security Engineering Electronic Security Systems

8.3 POWER

8.3.1 Exterior Primary Service

8.3.1.1 Substation Work

8.3.1.1.1 Substation No. 5, located on Kansas Avenue west of Grant, is currently being upgraded under another contract, with new 34.5 kV protective equipment, 12.47 kV switchgear and provisions for future expansion.

8.3.1.1.2 Under this contract, a new 7.5 mVA, 34.5-12.47Y/7.2 kV transformer, an SF6 circuit breaker and all associated structures, switches, bus work, bus supports and connections will be provided to accommodate the new Lewis and Clark Center (L&CC).

8.3.1.2 Medium Voltage Distribution Work

8.3.1.2.1 Bell Hall is currently served by an underground 12.47kV primary feeder circuit, designated feeder 4-1 that emanates from Substation No. 4 while the Combined Arms Research Library (CARL) is served by another underground primary circuit, designated feeder 5-1 which is fed out of Substation No. 5. Backup power for both of these facilities is provided by feeder circuit 5-2, which also comes from Substation No. 5.

8.3.1.2.2 The antiquated medium voltage primary feeders 5-1 and 5-2 are presently in conduit but are not concrete-encased. They will be replaced from Substation No. 5 to Switch Station No. 3 with a new 4-way concrete encased duct bank system carrying

2 sets of 3-1/C#4/0, 15kV copper cables and 1#4/0, 600V copper ground conductor, one set for each of the two feeders. There will be two spare ducts available for future primary circuits. Concrete manholes with cast iron covers and frames will be installed along the route at 100 to 110 meter intervals to facilitate cable pulling and future expansions.

8.3.1.2.3 This portion of the primary distribution system can be taken out of service for an extended period of time since all the affected loads can be fed out of Substation No. 1 until the new substation and distribution system work has been completed and placed in operation.

8.3.1.2.4 The two new feeders will be tapped in a new manhole in the vicinity of Grant Avenue and Cody Road. A new 4-way duct bank system, carrying new feeders 5-1 and 5-2, will be constructed from this manhole to the L&CC's primary service equipment.

8.3.1.2.5 Once the new facility is ready for occupancy and demolition of Bell Hall has begun, the underground primary service to Bell Hall will be removed.

8.3.1.2.6 All existing manholes scheduled for demolition will be removed in their entirety, the conductors shall be removed and returned to the government for disposal, unless directed otherwise, and the conduits will be abandoned in place unless leaving them would interfere with any new construction.

8.3.1.2.7 In conjunction with the realignment of Stimson Avenue, portions of the existing overhead distribution feeder circuits 3-4, 3-6 and 5-3 will be relocated; however the existing sectionalizing scheme will not be changed. That portion of overhead distribution circuit 3-6 north of the new building that extends north from the Eisenhower Hall-CARL complex will be replaced with an underground circuit that will share the 4-way duct bank serving the L&CC from the intersection of Grant Avenue and Cody Road. Rerouted feeder 3-6 will be connected to the existing feeder circuit 3-6 conductors in an existing manhole near the southeast corner of the CARL.

8.3.1.2.8 The line serving the historic houses along Wint Avenue is fed by that portion of feeder 3-6 that must be relocated due to the construction of the new building. This line also serves the sewer lift station which must also be relocated. By constructing two spans of overhead distribution line, this line can be reconnected to feeder circuit 3-

4 near the intersection of Stimson and Wint Avenues. The lift station will ultimately be fed from the new Lewis and Clark Center's electrical distribution system.

8.3.1.3 Lighting

8.3.1.3.1 The existing area lighting in the area of construction will be removed and new lighting installed around the building and along the realigned Stimson Avenue. New Cobra-Head style fixtures with 400 Watt high pressure sodium lamps on nine meter steel poles will be installed along the new portion of Stimson Avenue. However, the existing lighting fixtures may be reused if necessary.

8.3.1.3.2 New thoroughfare lighting, comprised of Cobra-Head style fixtures with 400 Watt high pressure sodium lamps on nine meter steel poles will be installed along the new Fourth Street extension from the area of the new secondary entry gate to where the new road intercepts Stimson Avenue.

8.3.2 Exterior Secondary Service

8.3.2.1 The L&CC will be fed by two 2500 kVA, three phase, 12.47kV to 480Y/277 V, out-door, pad mounted, liquid filled transformers each fed from a separate circuit from Substation 5 (Circuits 5-1 and 5-2). The transformers are sized to provide approximately 60% of the total demand load per TI-800-01. The transformers will be located outside the building such that they will not detract from the buildings appearance.

8.3.2.2 The system arrangement will be of the double-ended, Main-Tie-Main type to provide a level of redundancy if one feeder should fail.

8.3.2.3 Feeders from the transformers' secondary windings will run underground in Rigid Metal Conduit to the Main Switchboard (SWB) located in the main electrical equipment room on the east end of the L&CC.

8.3.3 Interior Power Distribution

8.3.3.1 The Main Switchboard is configured as two separate 480Y/277 Volt, three phase, four wire, 3000 Amp units connected by a 3000 Amp tie-breaker. Each unit is rear-connected and compartmentalized in a fully withdrawable construction. They provide electrical distribution, protection and power quality management for the facility. Both are equipped with ground-fault protection a complement of circuit breakers, spare spaces and power measuring/monitoring equipment.

8.3.3.2 Because of the size and ampacity of the swicthboard, the equipment room must have two exits at opposite ends of the switchboard per NFPA 70 (NEC) requirements. The doors must

open in the direction of egress and be equipped with panic bars, pressure plates or other similar devices (See NEC 110-26(C)(2)).

8.3.3.3 Secondary distribution will be at 480/277 Volt, three phase, four wire providing power to utilization equipment, lighting and step-down transformers for convenience outlet, user equipment, etc.

8.3.3.4 Loads were based on estimates derived from information gathered from the L&CC Design Charrette Report dated March 13, 2002 and updated as more timely information became available. When specific loads were not known, estimates were based on accepted standard estimating practices.

8.3.3.5 Each floor will be divided into four areas and each area will have its own Electrical Equipment Room (EER) to best serve the various loads. Additionally, the Auditorium will have an equipment room for its equipment.

8.3.3.6 Electrical/electronic equipment will be housed in dedicated equipment rooms separate from mechanical and other equipment. The equipment rooms will be environmentally conditioned as required.

8.3.3.7 480Y/277 Volt, three phase, four wire, 800 Amp Distribution Panels (DP), all located on the first level, will be fed from the Main Switchboard via Rigid Non-Metallic Conduit run under the floor. Conduit risers from the DPs will feed the various distribution equipment on the upper three levels.

8.3.3.8 Distribution Panels will feed Power Panels (PPs) that will provide power to HVAC and other 480Volt utilization equipment loads in addition to the transformers and lighting loads. All panelboards will have copper phase bus, ground bus and neutral bus. The panels serving the non-linear loads will be equipped with 200% neutral bus. Transformers will have copper windings.

8.3.3.9 The Distribution Panels and Power Panels will be circuit breaker type.

8.3.3.10 K-rated transformers (75kVA, 480V to 208Y/120 V, three phase) with double neutral lugs will used to provide power for much of the facility to diminish the affects of harmonic currents generated by the high concentration of non-linear loads.

8.3.3.11 The classrooms and their associated electronic loads will be fed from dedicated panelboards to isolate them from other circuits. A separate and oversized neutral will be used for each circuit to non-linear loads such as computers and related equipment. To afford flexibility, functionality, accessibility, and capacity in the classrooms with raised floors, a system of re-configurable, accessible floor modules containing both power and data receptacles will be installed. These modules can be easily relocated to accommodate various configurations dictated by classroom function. The workstations' power and data requirements will be met with the installation of a surface metal raceway with power and data receptacles located at each location.

8.3.3.12 Because of space limitations and the working clearance requirements of NEC 110-26(a), each classroom will not be serviced by an individual panel as recommended for Classroom

XXI. However, each classroom will have ample power to meet its requirements.

8.3.3.13 Each floor will be divided into four areas and each area will be equipped with distribution equipment to accommodate the needs of the area. The equipment will be located in Electrical Equipment Rooms (EERs) located in each of the four areas on each floor and will be fed from the main distribution switchgear located on the first level of the L&CC.

8.3.3.14 Electrical Metallic Tubing (EMT) will be used when installed in walls and ceiling space and not subject to physical damage.

8.3.3.15 Rigid Metal Conduit (RMC) will be used when installed in mechanical rooms, outdoors, above roof and wet areas and for feeders rated at 400 amps and above. PVC coated (40 mil thickness minimum) RMC may be used when installed in or passing through concrete.

8.3.3.16 Wire, unless otherwise noted, shall be stranded copper of the gage and insulation type shown.

8.3.3.17 The ungrounded conductors of the various voltage systems will be color coded per the following table:

Voltage System	**Phase A**	**Phase B**	**Phase C**
208Y/120 (Three Phase)	Black	Red	Blue
480Y/277 (Three Phase)	Brown	Orange	Yellow
120/240 (Single Phase)	Red	Black	

Conductor Identification Table

When the 208Y/120 volt and the 120/240 volt system are both used in the same project, use colors other than red and black for the 120/240 volt system.

8.3.3.18 Branch circuit wiring will be minimum 12 AWG, stranded copper with THHW insulation. Branch circuit wiring will be sized to maintain a voltage drop of three per cent or less. The length of many of the branch circuits will limit the number of end devices (and thus current) so that voltage drop will be kept to a minimum. All branch circuits will be installed in conduit. All interior conduits, except in unfinished areas, will be concealed.

8.3.3.19 Branch circuits, for the most part, will be run in Electric Metallic Tubing. They shall be routed overhead above the ceiling and then to the end device which they serve.

8.3.3.20 Voltage drop will be calculated by the following formula:

$$V_D = I \cdot Z_W \cdot D \cdot F_P / 1000$$

Where:
V_D = Voltage drop in Volts,
I = Current in Amps,
Z_W = Impedance of wire (cable) in ohms/km,
D = Distance in kilometers and
F_P = Phase factor, 2 for single phase, $\sqrt{3}$ for three phase circuits.

Voltage drop percentage will be calculated by the following formula:

V_D % = (V_D /V_I) •100

Where V_D = Voltage drop in Volts as calculated above and
V_I = The Initial Voltage in Volts

8.3.3.21 General use convenience outlets will be 125 volt, 2-pole, 3-wire, 20 Amp duplex receptacle (NEMA-type 5-20R). Floor mounted receptacles will be used in some of the "Technology" equipment spaces.

8.3.3.22 All receptacles within 1.8m of an open water source, in wet locations, exterior locations, toilets will be Ground Fault Circuit Interrupting (GFCI) protected. All exterior receptacles will also be weatherproof. Kitchen area receptacles will be GFCI as required.

8.3.3.23 Other NEMA-type receptacles will be used as required such as NEMA-type L5-30R, 125 V, 30 A, twist-lock receptacle.

8.3.3.24 Receptacles will be available along the walls for the workstations in the VTC classrooms and underneath the raised floors.

8.3.3.25 Workstations located in an open area with no adjacent walls will be fed from overhead via power pole integrated into the furniture system or from "poke-through"-type in-floor receptacles.

8.3.3.26 Receptacles in office areas will be spaced at 3.7 meters (12') maximum on centers. In corridors or hallways receptacles will be spaced on 12.2 meter centers and in other areas on 6.1 meter centers.

8.3.4 Emergency/Standby Power

Emergency/Standby Power will be provided to supply those loads identified as emergency or critical.

8.3.4.1 Life Safety

8.3.4.1.1 Atrium Smoke Removal

8.3.4.1.2 The National Fire Prevention Association (NFPA) and the Uniform Building Code (UBC) both require an atrium area to be provided with a smoke-control system (NFPA 101, 8.2.5.6 and UBC 402.2). And the NFPA requires the life safety system not be reliant upon a single safeguard for the safety of the occupants (NFPA 101, 4.5.1). The UBC requires the smoke control system to be supplied with two sources of power. The primary power shall be the normal building power and the secondary power shall be from an approved stand-by source in compliance with the Electrical Code (UBC 905.8.1). NFPA 70, National Electric Code (NEC) addresses the requirements for a legally required stand-by system (NEC 701). The NEC gives several

options for the stand-by source. The most compliant and practical of these options is a generator set.

8.3.4.1.3 The proposed generator will be a self contained, out-door rated, diesel engine driven generator set rated at 230 kW, 480 V, three phase, 60 Hz Stand-by application. It will be equipped with engine and generator monitoring and control instrumentation, battery charger, 200 gallon fuel tank, jacket water heater, hospital grade exhaust, digital voltage regulator, three pole breaker, weather protected enclosure.

8.3.4.1.4 The generator was sized based on the assumption that the supply and exhaust fans for the atrium area would be 10 HP and 15 HP respectively and that the supply and exhaust fans for the open area between the second and fourth floor would 20 HP and 25 HP respectively. The sizing was also based on the assumption that all four fans would be started simultaneously.

8.4 LIGHTING

8.4.1 General Building

8.4.1.1 The building lighting system will be designed in accordance with Illuminating Engineering Society (IES), DOD 4270.1-M TM-5-811-2 and TI 811-16 criteria to provide comfortable illumination levels for the required task to be accomplished in an efficient and safe manner.

8.4.1.2 General lighting levels for office areas, conference rooms, café, kitchen, lobbies, corridors and other areas will be designed to meet IES criteria.

8.4.1.3 Luminaires that are applicable to the specific area and lighting task requirements will be provided.

8.4.1.4 All lighting circuits will be controlled from switches, dimmers and or occupancy sensors depending on the room function.

8.4.1.5 Switches will be rated at 120/277 Volt, 20 Amp.

8.4.2 Classroom

Classroom lighting will be indirect, dimmable, fluorescent type luminaires that will provide adequate lighting for study purposes while being adjustable to prevent glare on monitor screens and will meet Class Room XXI criteria. The lighting level of each quarter of each “quad” section will be independently controllable and the entire “quad” can also be controlled as one continuous area. The lighting in the Video-Teleconferencing classrooms will be designed to provide proper light levels on the participants while preventing unwanted glare and luminous “hot spots”.

8.4.3 Specialty Lighting

Specialty lighting will be provided in such areas as the Distance Learning Suites, Lobby, Conference Rooms, Auditoriums, Trophy area, etc.

8.4.4 Safety

8.4.4.1 Emergency, egress and exit sign lighting will be of the self-contained battery/inverter back-up powered type.

8.4.4.2 Exit lights will be LED-type to assure long life, high visibility and low maintenance. Egress lighting will provide a minimum of one foot-candle illumination.

8.4.5 Exterior

Exterior luminaires will provide adequate lighting for safety as well as enhancing the aesthetics of the ceremonial entryway, the promenade around the pond and architectural elements of the building and surrounding grounds.

8.4.5.1 Parking Areas:
The parking areas and adjacent walkways will be lighted using nine meter steel poles with High Pressure Sodium Cobra Head style luminaires on single or double arm as required.

8.4.5.2 Walkways:
Walkways will be illuminated with architectural luminaires on three meter poles. Step Lights mounted in the Force Protection wall will light the bordering walkway.

8.4.5.3 Flag and Monument:
The American Flag at the L&CC entrance and the Berlin Wall Monument will be illuminated by in-ground up lights.

8.4.5.4 Lewis and Clark Center Entry Way:
Wall mounted Metal Halide luminaires will be used to illuminate the Lewis and Clark Center entryway.

8.4.5.5 Exterior Lighting switching will be automatically controlled to conserve energy but will have a manual override capability.

8.4.6 Street

8.4.6.1 Street Lighting will be designed in accordance with TM-5-811-1 and IES Lighting Handbook (RP-8).

8.4.6.2 Street Lighting switching will be automatically controlled to conserve energy but will have a manual override capability.

8.4.6.3 New street lighting along the Stimson Avenue realignment and the Fourth Street extension will consist of nine meter steel poles with 400 Watt High Pressure Sodium Cobra Head style luminaires spaced approximately every 23 to 30.5 meters depending on roadway configuration.

8.4.6.4 The assumption is made that a 480 Volt, three phase, 100 Amp source within 200 meters of the new Guard Shack can be obtained for the Fourth Street extension lighting. It is also assumed that an adequate power source is available for the

Stimson Avenue realignment or that the existing supply can be extended.

8.5 GROUNDING

The grounding system will comply with TM 8-811-1 and 2, IEEE Standards 80 and 142.

The system will be solidly grounded.

The grid will consist of copper wire and copper-clad steel ground rods and will attain an earth resistance not to exceed five Ohms.

Interior grounding will comply with EIA/TIA-607.

8.6 FIRE ALARM SYSTEM

The fire alarm system will be designed in accordance with MIL-HDBK-1008C, NFPA 70.

The fire alarm system will be equipped with battery back-up.

8.7 SECURITY SYSTEM

The security system will be equipped with battery back-up

8.8 LIGHTNING PROTECTION

Lightning Protection will be installed in accordance with TM 5-811-3, NFPA No. 780 and MIL-HDBR-419. The system will consist of air terminals, bonding conductors, copper grounding conductors and ground rods (21mm X 3050mm min.). The air terminals will extend a minimum of 0.25m above the object to be protected. The ground rods will surround the building at a distance between 0.3m and 2.4m from the foundation edge.

The Lightning Protection System grounding electrodes will be bonded, below grade, to the Power System grounding electrodes.

Lightning protection system for the L&CC must be tied into the system of any contiguous building's (CARL) system to attain UL Master Label

PART 9 - TECHNOLOGY SYSTEMS

9.1 DEFINITIONS

The following definitions are intended to provide a consistent set of terminology for the Lewis and Clark project.

Backbone - Main cables (both fiber and copper) connecting MC, TR, and ER together.

Encoding – The process of capturing analog video into a digital video stream.

ER - Equipment Room – Currently identified on the prints as the Server Farm. ER is the industry standard designation for this type of space. Future design phase and drawings will reflect this terminology.

MC - Main Cross-Connect -- Currently identified on the prints as the “Network Hub”. MC is the industry standard designation for this type of space. Future design phase and drawings will reflect this terminology. This space is also known as MDF (Main Distribution Frame) in which the terms may be used interchangeable.

MCU (Multi Point Conference Unit) – A device that compresses a video signal into a standard protocol (either H.320 or H.323) and allows a connection to be made to one (1) or more remote sites.

Point-to-Point – A local site to single remote site for the purpose of Video Conferencing.

Point-to-Multipoint – A local site to multiple remote sites for the purpose of Video Conferencing.

TR - Telecommunications Room – Currently identified on the prints as Comm Room. TR is the industry standard designation for this type of space. Future design phase and drawings will reflect this terminology. This space is also known as IDF (Intermediate Distribution Frame) and Comm Closet.

Video-on-Demand (VOD) – A centralized server used to store and deliver audio and video content that can be accessed via networked computers. Multiple formats and video standard exist which will be evaluated at a later date.

Streaming Video – The process of converting composite video (i.e, a VHS tape) to a digital stream to be distributed and accessed via networked computers.

9.2 COMMON BUILDING AREAS

9.2.1 Video Network Operations Center (Video NOC)

The Video NOC will support all day-to-day operations of the TRADOC Classroom XXI AV and Automation systems. The intent is to provide authorized, two-way, live audio or audio/video connections to each Classroom XXI for real-time technical support. Subject to approval of the CGSC leadership, the Video NOC will assist the classroom instructor with the following functions:

- Schedule remote connections (point-to-point or point-to-multipoint) for distance learning or video conferencing connections.
- Set-up a live broadcast with any internal classroom, Auditorium, Large Conference room, Marshall Auditorium, and any other interactive location.
- Assist or completely take over the operation of all Classroom XXI system functions (cameras, audio, plasma screens, control system, etc. – see Classroom XXI for further information).
- Receive and rebroadcast video programs originating from Eisenhower to all video locations. As such, CGSC authorized video content can be transmitted to Eisenhower for distribution.
- Broadcast any NOC source device (VCRs, DVD, audio DAT, etc.), streaming video clip (stored on a server), or video-on-demand program to any Classroom XXI, or any other specialty area.
- Real-time or stored streaming video clips of web-enabled programs to authorized students and staff.
- Basic training, remote system upgrades, and remote diagnostics.

Specific equipment will include:

- Two (2) large, wall mounted, plasma units for quad splitting and viewing broadcast.
- Four (4) computer workstations with flat screens, cameras, and microphones to permit technicians to assist the classroom instructor by scheduling VTC calls, controlling the in-room systems, trouble calls, etc.
- Source devices for centralized origination of media programs.
- Digital video servers for storage of digital content – may be located in the Server Room.
- Digital video encoders to allow any video signal to be digitized for delivery over the data network or internet.
- One (1) MCU with multiple H.320 and H.323 CODECs for handling Classroom XXI (and other spaces) remote connections (videoconferencing and distance learning).
- Fiber optic equipment to transmit and receive video and control signals between the Classroom XXI and the NOC.

9.3 BUILDING INFORMATION DISPLAYS

Selected circulation areas will be equipped with large video displays, probably plasma or other flat screen technology. The intent is to provide students, staff, and the general public with visual access to key information such as event schedules, building information, CGSC history, etc. The locations, screen sizes, and budget implications are still under review.

Specific equipment will be determined at a later date.

9.4 CLASSROOM XXI

The TRADOC Classroom XXIs will be designed to support new CGSC teaching paradigms per the TRADOC Classroom level 4 standards. The Charrette report calls for an environment that shifts the role of the teacher from general lecturer to a facilitator. The overall intent of the Classroom XXI is to augment current teaching methods by

providing a technologically rich environment to permit focused soldier training regardless of time or location – See the Charrette report for additional information.

Each classroom will be fully equipped with the latest technology to permit authorized instructors and students to:

- Access authorized training materials, programs, and stored content.
- Access multimedia programs and stored digital audio/video content via the Internet, intranet or onsite digital servers.
- Access centralized video programs from the NOC, auditorium, Marshall, and other equipped spaces.
- Schedule and participate in live, two-way, audio and video conferencing, collaborations, and distance learning broadcasts with one or more remote sites (up to 3 simultaneous sites). The program will support up to four (4) simultaneous events with each event involved in a 4-way conference call. Also, room-to-room connections are possible.
- Touch screen interface to all room presentation devices (VCR, DVD, DAT, computer inputs, etc.), plasma displays, lights, motorized screens, and room combining operations (i.e., combine the split rooms into one room for large group discussions).
- Touch screen controls for distance-learning functions (cameras, audio, far end controls, etc.).
- A high quality audio system supporting general lecture, presentation, and VTC broadcast.

Specific equipment will include:

- Data drops (unclassified) to permit up to 20 networked computer stations – See the Infrastructure Design Analysis for additional information. Note: the fourth floor Classroom XXIs will receive nine (9) secured drops each.
- Two (2) VIP input locations (video interface panel) to permit the instructor to teach from the instructor's station or in front of the room
- Full line of source devices that will be mounted in a cabinet and recessed in the wall for direct classroom access – see Sheet TA-411 for an enlarged detail.
- Cameras, VTC-type lighting (see electrical section for additional information), and push-to-talk microphones (1 for every 2 stations) for video conferencing broadcast. The cameras have been located to provide optimal viewing angles. The microphones will have floor disconnects to permit ninety-six (96) microphones to be shared across ninety-two (92) classrooms – this will permit 12 rooms with eight (8) microphones each to originate audio. Every instructor station will receive a microphone for sound enhancement purposes.
- Two (2), wall mounted, plasma displays will be installed in each Classroom XXI. One (1) plasma display will receive a Smart Board overlay for computer control-type commands.
- One (1) motorized screen will be recessed above the ceiling for portable equipment (primarily after hour use).
- One (1) control system with complete touch screen and low voltage controls to all AV/Automation devices, motorized screen, and interface to the NOC.
- Fiber optic equipment to send and receive video signals to and from the NOC.

9.5 DISTANCE LEARNING SUITES (CAS3)

The DL Suites have been designed following CAS3 requirements. The program's intent is to provide the latest technology to permit the instructor access to on-line, real-time, interactive video and multimedia computer delivered instruction via the Internet. The technology will encompass high-end digital capture workstation, dual flat screen monitors, an IP camera, VCR, DVD, audio, software and an interface to the internet.

Specific equipment will be selected at a later time.

9.6 CONFERENCE ROOMS

There are three (3) types of conference rooms within the CGSC facility. They are classified by room size and type: Large, Small, and Director's. The Large and the Small Conference rooms will receive presentation-type AV/Automation systems. The Director's Conference room will be equipped with existing equipment.

9.6.1 Large Conference Room

The overall intent of the Large Conference room is to support large groups requiring state-of-art technologies. The systems designed for this space will support the following functions:

- Presentation mode -- Support multiple audio/visual and computer presentation sources
- VTC mode -- Supports videoconferencing and distance learning applications and programs

Specific equipment includes:

- A control system to automate operations
- Rear screen projection system for presentation and VTC display.
- Full line of source devices that will be mounted in a cabinet– see Sheet TA-511 for an enlarged detail.
- Fiber optic equipment to transmit and receive video and control signals between the Large Conference Room and the NOC.
- Wall mounted motorized pan-tilt-zoom cameras for VTC.
- Front wall stereo loudspeakers.
- Ceiling speakers for reinforcement.
- Microphones, which have, push to talk activation.
- UHF Wireless Microphones.
- Digital tape recording.
- Control station and podium microphone, audio, video and RGB inputs.

9.6.2 Small Conference Rooms

Each Small Conference room will be equipped with presentation-type AV equipment to support small discussion groups.

The equipment will include:

- A control system to automate operations
- A plasma screen for presentation and VTC display.
- Wall mounted motorized pan-tilt-zoom cameras for VTC.
- Ceiling speakers for reinforcement.
- Microphones, which have, push to talk activation.
- Wall and floor mounted audio, video and RGB inputs.

9.6.3 Director's Conference Rooms

The director's conference rooms shall have standard network access, but currently do not have any presentation or other audio video capabilities. It is anticipated that some equipment will migrate from Bell Hall to support these functions in these spaces.

9.7 LARGE AND SMALL AUDITORIUMS

There are two (2) auditoriums within the CGSC facility: a Large Auditorium (1750 seat) and a Small Auditorium (Marshall Hall). The large auditorium will primarily be used to host events that involve 100% of the staff and students (i.e. graduation ceremonies, dignitaries, key speakers, etc.). Marshall Hall will be used mainly for large group instruction or for smaller events.

9.7.1 Large Auditorium

The large auditorium shall provide the following functions:

- Theatrical-type performances
- Presentation-type functions
- Large Group Videoconferencing

The equipment will include:

- Control system to automate operations.
- Front projection screen for presentation and VTC capabilities.
- Digital mixing console located in control room.
- Stage, podium and aisle microphone, audio, video and RGB inputs.
- Loudspeaker cluster and satellite loudspeakers throughout the auditorium.
- Fiber optic equipment to transmit and receive video and control signals between the Large Auditorium and the NOC.
- Wall mounted motorized pan-tilt-zoom cameras for VTC.
- Wireless UHF microphones.
- Plasma monitor located in "Green Room".
- Assisted listening transmitter and receivers.
- 2-way intercom system among technical staff.
- Full-line of source devices that will be mounted in cabinets– see Sheet TA-520 for an enlarged detail.

9.7.2 Small Auditorium (Marshall Hall)

The Small Auditorium Shall Provide The Following Functions:

- Presentation-type functions
- Large Group Videoconferencing

Proposed equipment includes:

- Control system to automate operations.
- Rear projection screen for presentation and VTC capabilities.
- Stage, podium and aisle microphone, audio, video and RGB inputs.
- Stereo loudspeakers throughout the auditorium.
- Fiber optic equipment to transmit and receive video and control signals between Marshall Hall and the NOC.
- Wall mounted motorized pan-tilt-zoom cameras for VTC.
- Wireless UHF microphones.
- Assisted listening transmitter and receivers.
- Full line of source devices that will be mounted in the AV cabinet– see Sheet TA-524 for an enlarged detail.

9.8 600 STAFF AND AUTOMATION EQUIPMENT

Staff and faculty areas throughout the CGSC facility will provide day-to-day operations and network access for staff and faculty. These areas will contain regular use PCs with accompanying 17-inch monitors. There will be additional multimedia “Power user” PCs with accompanying 19 inch monitors. Connection to the phone system will be provided in each of these spaces. Connection to the internal network will be provided in these spaces. There will be eight (8) centralized “Document Centers” throughout the facility to provide copying, printing and other document related production capabilities.

9.9 COMPUTER LAB

A 36-station computer lab for student use will be located on the second floor next to the DOET area. The intent of the lab is to permit students access to computers with the appropriate software and internet access for research, reading assignments, e-mails, etc.

Specific equipment will include:

- Thirty-six (36) networked computers (unclassified)
- Two (2) networked laser printers
- Two (2), wall mounted, plasma screens

The room will be designed with a raised floor and rough-in conduit to permit the room to be reconfigured into a future Classroom XXI, if needed. Additional equipment will be required.

9.10 LANGUAGE LAB

CGSC supports an existing language lab program and has a large investment in audiocassette tapes to assist foreign students and spouses to learn English as a second language. A 25 station Language Lab is planned in the new CGSC facility that must include the ability to handle the existing format and newer technologies (digital).

Specific equipment will be determined at a later date.

9.11 SECURED CLASSROOMS (SCIF)

The SCIF Classrooms is a high-secured area. Each room will be equipped with standalone presentation-type audio/video equipment for security reasons. Each SCIF classroom will have the ability to:

- Display VCR and DVD titles for student viewing via the in-room source devices – the content will not be shared across rooms.
- Display a computer image to the wall-mounted Plasma screen.
- Install a motorized screen to support projector-type technologies.
- Convert traditional paper copy and transparencies to a video image via a document camera for viewing on the Plasma Display.
- Audio reinforcement will be limited to the program audio only – no microphones or VTC.

Specific equipment includes:

- One (1), wall mounted, plasma display
- VCR, DVD, and document camera
- Audio System

9.12 DIGITAL LEADERSHIP DEVELOPMENT CENTER

The current budget provides for black and red data drops and associated data electronics only – See the Infrastructure Design Analysis for more information. No AV/Automation equipment has been planned for in this area.

9.13 NETWORK ELECTRONICS

9.14 NETWORK CONNECTIVITY

9.15 EQUIPMENT AND DEVICES

9.16 TELEPHONE

Budget has been allocated under OPA for the purchase and installation of the data network equipment and telephone switch equipment and instruments. It is expected that the backbone will be switched 10 GB Ethernet on the backbone, and Gigabit Ethernet to the desktop. This is subject to change based on new technology advancements and will be continuously monitored.

The phone system will be an extension of the existing base phone system operated by DOIM. It is expected to transfer existing service from Bell Hall, as well as add additional services to meet the needs of the Lewis and Clark facility. There is no current plan for any switching equipment to be located within Lewis and Clark.

The data topology, number of switches, servers, and phone configuration will follow in the next phase.

9.17 BUILDING INTERIOR INFRASTRUCTURE

The infrastructure will be installed in accordance with applicable industry and Military standards and regulations.

Each space within the CGSC facility will be cabled as stated below. Note: the quantities mentioned below are based on the Charrette Report.

9.17.1 Classrooms XXI

There are 92 standard classrooms; their equipment list will include the following:

- 9 locations will be served from beneath the raised floor with 2 category 6 UTP cables and one duplex MM fiber for communications.
- 8 additional locations will be served from surface mounted raceway for student PC's with 2 category 6 UTP cables and one duplex MM fiber for communications.
- 4 locations will be served with a broadband/CATV connection (1 at the front VIP location, 1 at the back of each classroom, 1 at teachers location, and 1 in the video cabinet).
- A single wall phone jack will be provided in each classroom, location to be coordinated during the next design phase.

There will be 24 classrooms on the fourth floor, which will have additional fiber cabling for secure communication; additional classroom material list will include the following:

- 8 locations will be served from surface mounted raceway for student PC's with one duplex MM for communications. This cabling will be placed below the desk area to provide proper separation from the non-secure cabling. Additionally there will be 1 teacher's location served by one duplex MM for communications from a separate floor station. These locations will be served from a separate "Red" TC on the 4th floor and run enclosed in conduit from the work area to the Red TC on 4th floor.

9.17.2 SCIF Classrooms

There will be 4 secure classrooms in the secure area on first floor; their equipment list will include the following:

- 9 locations will be supplied with 2 category 6 UTP cables and one duplex MM communications.

- 8 additional locations will be served from surface mounted raceway for student PC's with 2 category 6 UTP cables and one duplex MM communications.

9.17.3 Distance Learning Suites

There will be 30 distance-learning suites; the suites will be equipped with the following:

- 4 locations will be supplied with 2 category 6 UTP cables and one duplex MM fiber for communications.
- 1 location will be supplied with a broadband/CATV connection.

9.17.4 Office-Administration

There will be 600 office spaces for faculty and administration; their equipment will include the following:

- These spaces will be supplied each with 2 category 6 UTP cables and one duplex MM fiber for communications.
- Broadband/CATV connections will be provided at some locations TBD during next design phase.

9.17.5 Computer Lab

There will be one computer lab; the equipment will include the following:

- The Computer Laboratory will have 16 work area locations, each with 2 category 6 UTP cables and one duplex MM fiber for communications.
- 8 locations will be supplied with a broadband/CATV connection.

9.17.6 Language Lab

There will be one language laboratory; the equipment will include the following:

- The Language Lab will have 24 outlet locations, each with 2 category 6 UTP cables and one duplex MM fiber for communications.
- 2 locations will be supplied with a broadband/CATV connection.

9.17.7 Digital Leader Development Center

In the Digital Leader Development Center, the equipment will include the following:

- The DLDC will have 84 outlet locations, each with 2 category 6 UTP cables and one duplex MM fiber for communications.
- Broadband/CATV connections will be provided at some locations TBD during next design phase.

9.17.8 Conference Rooms

There will be 9 Conference Rooms; the equipment will include the following:

- The Conference Rooms will have 8 work area locations, each with 2 category 6 UTP cables and one duplex MM fiber for communications.
- 4 of the locations will be supplied with a broadband/CATV connection.

9.17.9 Auditorium

There will be 2 Auditorium's; the equipment will include the following:

- The Auditorium will have outlets with 2 category 6 UTP cables and one duplex MM fiber for communications. There will be up to 8 outlets located on stage, back stage, projection locations and other locations TBD during the next design phase.
- There will be broadband/CATV connections at each AUX input location (see audio visual section).

9.17.10 Document Centers

There will be 8 document counters; each equipped with the following:

- Each location will be supplied each with 2 category 6 UTP cables for communications

SPiRiT v 1.4

The Army Command and General Staff College (CGSC) programmatic requirement is to achieve a SPiRiT rating of bronze. SPiRiT v 1.4 is based on LEED 2.0 Green Building Rating System ^{TM} and is used with full legal agreement between the Corps and the USGBC. The SpiRiT system is comprised of seven (7) fully integrated divisions in order to create a holistically designed facility. The strategies employed for the CGSC for each of these divisions are as follows:

1.0 Sustainable Sites – The CGSC is sited to avoid a natural riparian area and partially built upon an abandoned landfill and sewage treatment plant. The Post provides for shuttle transport and bike lockup. Specifications for storm water management will be employed.

2.0 Water Efficiency – The facility is intending to use an efficient irrigation system and will use water saving fixtures.

3.0 Energy and Atmosphere – The CGSC will employ building commissioning and either water source or other geothermal heat pump mechanical systems to reduce energy use by approximately 10%.

4.0 Materials and Resources – The post has a recycling collection system and the new facility will integrate into the process. Materials will use recycled content, rapidly renewable materials and local/regional materials. The vast amount of historic memorabilia will be relocated to the new facility and the stained glass displays will be incorporated into the new fenestration systems. Specifications for construction waste management will be employed.

5.0 Indoor Environmental Quality – The CGSC will meet ASHRAE standards, smoking will not be allowed in the facility. Selected materials will have little or no VOC off gassing, minimize chemical and pollutant sources, meet thermal comfort and ventilation standards, provide for acoustic separation and noise control and take full advantage of daylight and views to reduce lighting loads.

6.0 Facility Delivery Process – The CGSC was designed using a holistic delivery method with an interdisciplinary team participating in the design charette, and providing for mini-workshops in sustainable design.

7.0 Current Mission – The purpose of building the CGSC was to increase soldier and workforce productivity and retention and reduce longterm operations and maintenance.

8.0 Future Missions – The CGSC is being designed for a functional life span of over 50 years with adaptable reuse in many of the areas including the large classroom areas with raised flooring and IT systems.

SPIRIT V 1.4 EVALUATION
Project: New Command and General Staff College at Fort Leavenworth

SPiRiT PREREQUISITES/ CREDITS	REQUIREMENT	POINTS AVAIL.	YES	PROBABLE	MAYBE	NO	COMMENTS	SUSTAINABLE REVIEW COMMENTS/ ACTION ITEMS	ESTIMATED ADDITIONAL COST	NOTES
SUSTAINABLE SITES										
Site Prerequisite: Erosion and Sedimentation Control	Design to a site sediment and erosion control plan that conform to best management practices in the EPA's Storm Water Management for Construction Activities, Chapter 3, OR local Erosion and Sedimentation Control standards and codes, which ever is more stringent. The plan shall meet the following objectives: Prevent loss of soil during construction by storm water runoff and/or wind erosion, including protecting topsoil by stockpiling for reuse. Prevent sedimentation of storm sewer or receiving streams and/or air pollution with dust and particulate matter.	REQ'D.	X				Compliance with 64 FR 68722 (Stormwater phase II)	Stamped drawing(s) and/or specifications highlighting storm water & erosion control measures.Storm Water Management Plan that meets the TRNCC/EPA requirements. Erosion Control Plan that meets TNRCC/EPA requirements		
Site Credit 1: Site Selection	Do not develop buildings on portions of sites that meet any one of the following criteria: 1) Land whose elevation is lower than 5 ft. above the 100 year flood as defined by FEMA. 2) Land that provides habitat for any species on the Federal or State threatened or endangered list 3) Prime training or manuever land 4) Within 100 feet of any wetland as defined by 40 CFR, Parts 230-233 and Part 22 OR as defined by local or state rule or law, whichever is more stringent	1	**1**					The ravine is NOT a wetland nor riparian corridor as per State Fish and Wildlife		

SPIRIT V 1.4 EVALUATION
Project: New Command and General Staff College at Fort Leavenworth

SPiRiT PREREQUISITES/ CREDITS	REQUIREMENT	POINTS AVAIL.	YES	PROBABLE	MAYBE	NO	COMMENTS	SUSTAINABLE REVIEW COMMENTS/ ACTION ITEMS	ESTIMATED ADDITIONAL COST	NOTES
	Select site close to existing roads and utilities or use an existing structure to minimize the need for new infrastructure 2) Select site in area of high density 3) Site facilities based on the strength of their relationships to othe facilities/land-uses to limit travel distances 5) Select for distance to installation/base transit systems and access to pedestrian waks and bike paths 6) Select for development previously used or developed suitable and available sites	1				**1**		Site is not in a high density area		
Site Credit 2: Installation/Base Redevelopment	Increase localized density to conform to existing or desired density goals by utilizing sites that are located within existing cantonment areas of high development density.	1				**1**		Site is not in a high density area		
	Select site close to existing roads and utilities or use an existing structure to minimize the need for new infrastructure	1				**1**		New construction includes new access room		
Site Credit 3: Brownfield Redevelopment	Develop on a site classified as a brownfield and provide remediation as requried by EPS's Brownfield Redevelopment program requirements OR develop a brownfield site (a	1				**1**		Site is not a designated Brownfield		
Site Credit 4: Alternative Transportation	Locate building within ½ mile of installation/base transit system	1	**1**				Both shuttle bus routes stop at College	Give reference to the sheets that detail these measures.		
	Provide suitable means for securing bicycles, with convenient changing/shower facilities for use by cyclists, for 5% or more of building occupants	1				**1**		Normal IDG requirement for bike racks, however, shower/changing in restrooms have been deleted.		
	Locate building within 2 miles of alternative-fuel refueling stations	1			**1**		Check with base about alternative fuels use	Give reference to the sheets that detail these measures.		

SPIRIT V 1.4 EVALUATION
Project: New Command and General Staff College at Fort Leavenworth

SPiRiT PREREQUISITES/ CREDITS	REQUIREMENT	POINTS AVAIL.	YES	PROBABLE	MAYBE	NO	COMMENTS	SUSTAINABLE REVIEW COMMENTS/ ACTION ITEMS	ESTIMATED ADDITIONAL COST	NOTES
	Size parking capacity to meet only minimum installation cantonment requirements AND provide preferred parking for carpools or van pools capable of serving 5% of the building occupants, OR, add no new parking for rehabilitation projects AND provide preferred parking for carpools or van pools capable of serving 5% of the building occupants..	1				**1**	Verify with post	Project is adding new parking that exceeds minimum installation cantonment requirements.		
Site Credit 5: Reduced Site Disturbance	On greenfield sites, limit site disturbance including earthwork and clearing of vegetation to 40 feet beyond the building perimeter, 5 feet beyond primary roadway curbs, walkways, and main utility branch trenches, and 25 feet beyond pervious paving areas that require additional staging areas in order to limit compaction in the paved area; OR, on previously developed sites, restore a minimum of 50% of the remaining open area by planting native or adapted vegetation.	1	**1**				Verify with post	Provide a clear and simple sketch highlighting that the building footprint (including building, utilities, access, and parking) exceeds the local zoning's open space requirement for the site by no more than 24%. Note the footprint size and local zoning's open space requirementon the site drawings. Show calculations to verify.		
	Reduce the development footprint (including building, access roads and parking) exceed the installation/base's/base's master plan local zoning's open space requriement for the site by 25% or in accordance with installation/base policy on open space set asides, whichever is greater.	1	**1**					Base does not have a standard. This point is assigned based upon group consensus including COE input.		
Site Credit 6: Stormwater Management	Implement a stormwater management plan that results in: No net increase of stormwater runoff from undeveloped to developed conditions.	1			**1**		Design issue/cost validation	If we incorporate the Bell Hall demo as permeable to offset new runoff this might happen. Could also utilize ravine if natural designation is favorable		

SPIRIT V 1.4 EVALUATION
Project: New Command and General Staff College at Fort Leavenworth

SPiRiT PREREQUISITES/ CREDITS	REQUIREMENT	POINTS AVAIL.	YES	PROBABLE	MAYBE	NO	COMMENTS	SUSTAINABLE REVIEW COMMENTS/ ACTION ITEMS	ESTIMATED ADDITIONAL COST	NOTES
	Treatment systems designed to remove 80% of the average annual post development total suspended solids (TSS) and 40% of the average annual post development total phophorous (TP) by implementing Best Management Practices (BMPs) outlined in EPA's Guidance Specifying Management Measures for SOurces of Nonpoint Pollution in Coastal Waters (EPA-840-B-92-002 1/93)	1				**1**		Doubtful that this would be covered by the SOW		
Site Credit 7: Landscape and Exterior Design to Reduce Heat Islands	Provide shade (within 5 years) on at least 30% of non-roof impervious surface on the site, including parking lots, walkways, plazas, etc., OR, use light-colored/high-albedo materials (reflectance of at least 0.3) for 30% of the site's non-roof impervious surfaces, OR place a minimum of 50% of parking space under-ground OR use open-grid pavement system (net impervious area of LESS than 50%) for a minimum of 50% of the parking lot area.	1		**1**				Give reference to the sheets that include the following information:1. Required tree density. 2. Total square footage of impermeable ground surface area and the total number of trees. 3. ____% of the roofing material(s) are light in color with an albedo reflectance of at least 0.5. Provide a cut sheet with albedo reflectance highlighted for each of these roofing material(s), OR a letter from manufacturer or independent research facility that states the albedo reflectance.4. ___% of the non-parking impervious surface material(s) are light in color with an albedo reflectance of at least 0.5. 5. Confirm that a light colored aggregate without a final coat of black-top will be used for impervious surfaces of outdoor parking lots.		
	Use ENERGY STAR Roof-compliant, high-reflectance roofing AND low-emissivity roofing (initial reflectance of at least .65 and three-year-aged reflectance of at least .5) for a minimum of 75% of the roof surface; OR, install a "green" (vegetated) roof for at least 50% of the roof area.	1	**1**					Provide a cut sheet with albedo reflectance highlighted for each of these roofing material(s), or a letter from manufacturer or independent research facility that states the albedo reflectance		

SPIRIT V 1.4 EVALUATION
Project: New Command and General Staff College at Fort Leavenworth

SPiRiT PREREQUISITES/ CREDITS	REQUIREMENT	POINTS AVAIL.	YES	PROBABLE	MAYBE	NO	COMMENTS	SUSTAINABLE REVIEW COMMENTS/ ACTION ITEMS	ESTIMATED ADDITIONAL COST	NOTES
Site Credit 8: Light Pollution Reduction	Meet Illuminating Engineering Society of North America (IESNA) footcandle level requirements as stated in the Recommended Practice Manual: Lighting for Exterior Environments, AND design interior and exterior lighting such that zero direct-beam illumination leaves the building site.	1		**1**			Need to meet with landscape designer regarding base standards	Short paragraph detailing justification of points earned.		
Site Credit 9: Optimize Site Features	Maximize the use of free site energy. Plan facility, parking and roadways to fit existing contours and limit cut and fill.	1				**1**		New cosntruction will have extensive cut and fill.		
Site Credit 10: Facility Impact	Cluster facilities to reduce impact, access distance to utilities and sufficient occupant density to support mass transit.	1	**1**				Get info from IDG	Copy of approved Installation Master Plan.		
	Collaborate with installation and community planners to identify and mitigate potential impacts of the project beyond site boundaries, and transportation planners to insure efficient public transport.	1	**1**				Get info from IDG	Copy of approved Installation Master Plan.		
Site Credit 11: Site Ecology	Develop site environmental management and mitigation plan	1			**1**		investigate plan req's	Provide a copy of the Written Environmental and Mitigation Plan with a brief summary.		
WATER EFFICIENCY										
Water Credit 1: Water Efficient Landscaping	Use high efficiency irrigation technology, OR use captured rain or recycled site water to reduce potable water consumption for irrigation by 50% over conventional means.	1				**1**	Could claim this by not using irrigation system	Facility will not be using recycled water		
	Use only captured rain or recycled site water for an additional 50% reduction (100% total reduction) of potable water for site irrigation needs, OR, do not install permanent landscape irrigation systems.	1		**1**				Project will be installing irrigation for primary areas.		

SPIRIT V 1.4 EVALUATION
Project: New Command and General Staff College at Fort Leavenworth

SPiRiT PREREQUISITES/ CREDITS	REQUIREMENT	POINTS AVAIL.	YES	PROBABLE	MAYBE	NO	COMMENTS	SUSTAINABLE REVIEW COMMENTS/ ACTION ITEMS	ESTIMATED ADDITIONAL COST	NOTES
Water Credit 2: Innovative Wastewater Technologies	Reduce the use of municipally provided potable water for building sewage conveyance by a minimum of 50%, OR, treat 100% of wastewater on site to tertiary standards.Standard references a wastewater baseline according to the methodology outlines in the LEED reference guide.	1				**1**				
Water Credit 3: Water Use Reduction	Employ strategies that in aggregate use 20% less water than the water use baseline calculated for the building (not including irrigation) after meeting Energy Policy Act of 1992 fixture performance requirements.	1			**1**		design/base issue, need to understand usage and check with operations	Give reference to the specification sections documenting associated fixtures and include short description of intended plans for reduction in water usage.		
	Exceed the potable water use reduction by an additional 10% (30% total efficiency increase).Standard references a water use baseline including all water consuming fixtures, equipment and seasonal conditions according to methodology guidance outlines in the LEED Reference Guide.	1				**1**				
ENERGY and ATMOSPHERE										
Prerequisite 1: Fundamental Building Systems Commissioning	Implement all of the following fundamental best practice commissioning procedures. Engage a commissioning authority. Develop design intent and the basis of design documentation. Include commissioning requirements in the construction documents. Develop and utilize a commissioning plan. Verify installation, functional performance, training and documentation. Complete a commissioning report.	REQ'D.	X					Short summary of commissioning plan with references to commissioning report.		
Prerequisite 2: Minimum Energy Performance	Design to meet building energy efficiency and performance as required by TI 800-01 (Design Criteria)	REQ'D.	X					Summarize energy performance strategies and include copies of BLAST, DOE-2 or EnergyPlus results.		
Prerequisite 3: CFC Reduction in HVAC&R Equipment	Zero use of CFC-based refrigerants in new building HVAC&R systems. When reusing existing HVAC equipment, complete a comprehensive CFC phaseout conversion.	REQ'D.	X					Give reference to specification section(s) documenting appropriate HVAC&R equipment.		

SPIRIT V 1.4 EVALUATION
Project: New Command and General Staff College at Fort Leavenworth

SPiRiT PREREQUISITES/ CREDITS	REQUIREMENT	POINTS AVAIL.	YES	PROBABLE	MAYBE	NO	COMMENTS	SUSTAINABLE REVIEW COMMENTS/ ACTION ITEMS	ESTIMATED ADDITIONAL COST	NOTES
Energy Credit 1: Optimize Energy Performance.	Reduce design energy usage (DEU) compared to the energy use budget (EUB) in joules per square meter per year for regulated energy components as described in the requirements of Chapter 11 of the TI 800-01 (Design Criteria) as demonstrated by a whole building simulation. 1 point will be awarded for every reduction in design energy use of 2.5% for both new and existing facilities for a maximum score of 20 points.	20	**4**	**4**	**4**	**8**	verify baseline with mechanical, assuming energy savings form baseline as 10%, this is down 10% based upon design and systems development	Provide a concise written summary detailing solutions for optimization and give reference to supporting documents. These may include plans, sections, elevations, details, specifications, computer analysis, and possible compter renderings of interior spaces and exterior treatments.		
Energy Credit 2: Renewable Energy	Supply a net fraction of the building's total energy use through the use of on-site renewable energy systems. % of Total Energy Load in Renewables Pts. 5%: 1 point; 10%: 2 points; 15%: 3 points; 20% 4 points	4				**4**		Unlikely that we will be able to isolate any significant loads to justify PV use.		

SPIRIT V 1.4 EVALUATION
Project: New Command and General Staff College at Fort Leavenworth

SPiRiT PREREQUISITES/ CREDITS	REQUIREMENT	POINTS AVAIL.	YES	PROBABLE	MAYBE	NO	COMMENTS	SUSTAINABLE REVIEW COMMENTS/ ACTION ITEMS	ESTIMATED ADDITIONAL COST	NOTES
Energy Credit 3: Additional Commissioning	In addition to the fundamental Building Commissioning prerequisite, implement the following additional commissioning tasks:The following CAN NOT be performed by the designer: 1. Conduct a focused review of the design prior to the construction documents phase 2. Conduct a focused review of the construction documents when close to completion 3. Conduct a selective review of contractor submittals of commissioned equipment. The following CAN be performed by the designer: 1. Develop a system and energy management manual 2. Have a contract in place for a near-warranty end or post occupancy review. Refer to LEED Reference Guide for detailed descriptions	1				**1**		Unlikely that SOW covers this option		
Energy Credit 5: Measurement and Verification	Comply with the installed equipment requirements for continuous metering as stated in selected Measurement and Verification Methods Option B: Retrofit Isolation of the US DOE's International Performance Measurement and Verification Protocol (IPMVP) for the following: Lighting systems and controls. Constant and variable motor loads. Variable frequency drive (VFD) operation. Chiller efficiency at variable loads (kW/ton). Cooling load. Air and water economizer and heat recovery cycles. Air distribution static pressures and ventilation air volumes. Boiler efficiencies. Building specific process energy efficiency systems and equipment. Indoor water risers and outdoor irrigation systems.	1			**1**		verify base requirements	Brief written justification of credit earned.		

SPIRIT V 1.4 EVALUATION
Project: New Command and General Staff College at Fort Leavenworth

SPiRiT PREREQUISITES/ CREDITS	REQUIREMENT	POINTS AVAIL.	YES	PROBABLE	MAYBE	NO	COMMENTS	SUSTAINABLE REVIEW COMMENTS/ ACTION ITEMS	ESTIMATED ADDITIONAL COST	NOTES
Energy Credit 6: Green Power	Engage in a two-year contract to purchase the amount of power equal to projected building consumption generated from renewable sources that meet the Center for Resource Solutions (CRS) Green-E requirements.	1				**1**		Green power is not available for this project (?)		
Energy Credit 7: Distributed Generation	Reduce total energy usage and emissions by considering source energy implications and local cogeneration and direct energy conservation. Generate at least50% of the building's projected annual consumption by on-site distributed generation sources.	1				**1**		Distributed generation is not part of this project		
MATERIALS and RESOURCES										
Materials Prerequisite: Storage & Collection of Recyclables	Provide an easily accessible area that serves the entire building that is dedicated to the separation, collection and storage of materials for recycling including (at a minimum) paper, glass, plastics, and metals.	REQ'D.	x				Coordinate with base regarding recycling operations	Give reference to the sheets that detail these measures.		
Materials Credit 1: Building Reuse	1. Maintain at least 75% of existing building structure and shell (exterior skin and framing excluding window assemblies). 1. Maintain an additional 25% (100% total) of existing building structure and shell (exterior skin and framing excluding window assemblies) 1. Maintain 100% of existing building structure and shell AND 50% non-shell (walls, floor coverings, and ceiling systems)	3				**3**		Bell Hall to remain occupied until project complete and then demolished. No opportunity for shell reuse		

SPIRIT V 1.4 EVALUATION
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SPiRiT PREREQUISITES/ CREDITS	REQUIREMENT	POINTS AVAIL.	YES	PROBABLE	MAYBE	NO	COMMENTS	SUSTAINABLE REVIEW COMMENTS/ ACTION ITEMS	ESTIMATED ADDITIONAL COST	NOTES
Materials Credit 2: Construction Waste Management	Develop and implement a waste management plan, quantifying material diversion by weight.	N/A								
	Recycle and/or salvage at least 50% (by weight) of construction, demolition, and land clearing waste.	1			**1**			Brief written justification of credit earned.		
	Recycle and/or salvage an additional 25% (75% total by weight) of the construction, demolition, and land clearing debris.	1				**1**				
Materials Credit 3: Resource Reuse	1. Specify salvaged or refurbished materials for 5% of building materials.1. Specify salvaged or refurbished materials for 10% of building materials.	2		**1**		**1**	electronic replacement of memorabilia, and asbestos remediation will practically eliminate this item	Determine the percentages in terms of dollars, in written plan justifying points earned. Giver reference to specification sheets providing proof.		
Materials Credit 4: Recycled Content	Specify a minimum of 25% of building materials that contain in aggregate a minimum weighted average of 20% post-consumer recycled content material, OR, a minimum weighted average of 40% post-industrial recycled content material.	1	**1**					Specifications		
	Specify an additional 25% (50% total) of building materials that contain in aggregate, a minimum weighted average of 20% post-consumer recycled content material, OR, a minimum weighted average of 40% post-industrial recycled content material.	1			**1**			Whole Building quantities from take offs to verify.		
Materials Credit 5: Local/Regional Materials	Specify a minimum of 20% of building materials that are manufactured regionally within a radius of 500 miles.	1			**1**		Investigate regional availability			
	Of these regionally manufactured materials, specify a minimum of 50% that are extracted, harvested, or recovered within 500 miles.	1				**1**				
Material Credit 6: Rapidly Renewable Materials	Specify rapidly renewable building materials for 5% of total building materials.	1		**1**				This could be a possibility on interiors….		

SPIRIT V 1.4 EVALUATION
Project: New Command and General Staff College at Fort Leavenworth

SPiRiT PREREQUISITES/ CREDITS	REQUIREMENT	POINTS AVAIL.	YES	PROBABLE	MAYBE	NO	COMMENTS	SUSTAINABLE REVIEW COMMENTS/ ACTION ITEMS	ESTIMATED ADDITIONAL COST	NOTES
Material Credit 7: Certified Wood	Use a minimum of 50% of wood-based materials certified in accordance with the Forest Stewardship Council guidelines for wood building components including but not limited to framing, flooring, finishes, furnishings, and non-rented temporary construction applications such as bracing, concrete form work and pedestrian barriers.	1			**1**		Investigate availability			
INDOOR ENVIRONMENTAL QUALITY										
IEQ Prerequisite 1: Minimum IAQ Performance	Meet the minimum requirements of voluntary consensus standard ASHRAE 62-1999, Ventilation for Acceptable Indoor Air Quality and approved Addenda.	REQ'D.	x							
IEQ Prerequisite 2: Environmental Tobacco Smoke (ETS) Control	Zero exposure of nonsmokers to ETS by prohibition of smoking in the building, OR, by providing a designated smoking room designed to effectively contain, capture and remove ETS from the building. At a minimum, the smoking room shall be directly exhausted to the outdoors with no recirculation of ETS-containing air to the non-smoking area of the building, enclosed with impermeable structural deck-to-deck partitions and operated at a negative pressure compared with the surrounding spaces of at least 7 Pa (0.03 inches of water gauge.) Performance of smoking rooms shall be verified using tracer gas testing methods as described in ASHRAE Standard 129-1997. Acceptable exposure in non-smoking areas is defined as less than 1% of the tracer gas concentration in the smoking room detectable in the adjoining non-smoking areas. Smoking room testing as described in the ASHRAE Standard 129-1997 is required in the contract documents and critical smoking facility systems testing results must be included in the building commissioning plan and report	REQ'D.	x							

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SPiRiT PREREQUISITES/ CREDITS	REQUIREMENT	POINTS AVAIL.	YES	PROBABLE	MAYBE	NO	COMMENTS	SUSTAINABLE REVIEW COMMENTS/ ACTION ITEMS	ESTIMATED ADDITIONAL COST	NOTES
IEQ Credit 1: IAQ Monitoring	Install a permanent carbon dioxide (CO2) monitoring system that provides feedback on space ventilation performance in a form that affords operational adjustments, AND specify initial operational set point parameters that maintain indoor carbon dioxide levels no higher than outdoor leveles by more than 530 parts per million at any time.	1			**1**		Cost constraints will probably limit this			
IEQ Credit 2: Increase Ventilation Effectiveness	For mechanically ventilated buildings, design ventilation systems that result in an air change effectiveness (E) greater than or equal to 0.9 as determined by ASHRAE 129-1997. For naturally ventilation spaces, demonstrate a distribution and laminar flow pattern that involves not less than 90% of the room or zone area in the direction of air flow for at least 95% of hours of occupancy.	1	**1**							
IEQ Credit 3: Construction IAQ Management Plan	Develop and implement an Indoor Air Quality (IAQ) Management Plan for the construction and pre-occupancy phases of the building as follows:	N/A								
	During construction meet or exceed the minimum requirements of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guideline for Occupied Buildings under Construction, 1995, AND protect stored on-site or installed absorptive materials from moisture damage, AND replace all filtration media immediately prior to occupancy (Filtration media shall have a Minimum Efficiency Reporting Value (MERV) of 13 as determined by ASHRAE 52.2- 1999).	1	**1**					Standard practice		

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	Conduct a minimum two-week building flushout with new filtration media at 100% outside air after construction ends and prior to occupancy, OR, conduct a baseline indoor air quality testing procedure consistent with current EPA protocol for Environmental Requirements, Baseline IAQ and Materials, for the Research Triangle Park Campus, Section 01445.	1			**1**			probably not feasible due to time constraints		
IEQ Credit 4: Low-Emitting Materials	Meet or exceed VOC limits for adhesives, sealants, paints, composite wood products, and carpet systems as follows:	N/A								
	Adhesives must meet or exceed the VOC limits of South Coast Air Quality Management District Rule #1168 by, AND all sealants used as a filler must meet or exceed Bay Area Air Resources Board Reg. 8, Rule 51.	1		**1**				probably not applicable or feasible		
	Paints and coatings must meet or exceed the VOC and chemical component limits of Green Seal requirements.	1	**1**					Going to assume this for the moment		
	Carpet systems must meet the Carpet and Rug Institute Green Label Indoor Air Quality Test Program.	1	**1**					Going to assume this for the moment		
	Composite wood products must contain no added urea-formaldehyde or phenol-formaldehyde resins.	1	**1**					Going to assume this for the moment		

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IEQ Credit 5: Indoor Chemical and Pollutant Source Control	Design to minimize cross-contamination of regularly occupied areas by chemical pollutants: Employ permanent entryway systems (grills, grates, etc.) to capture dirt, particulates, etc. from entering the building at all high volume entryways, AND provide areas with structural deck to deck partitions with separate outside exhausting, no air recirculation and negative pressure where chemical use occurs (including housekeeping areas and copying/print rooms), AND provide drains plumbed for appropriate disposal of liquid waste in spaces where water and chemical concentrate mixing occurs.	1	**1**					Make sure vestibule areas with walkoffs and ventilation is coordinated		
IEQ Credit 6: Controllability of Systems	Provide a minimum of one operable window and one lighting control zone per 200 s.f. for all occupied areas within 15 feet of the perimeter wall.	1			**1**		not in present design			
	Provide controls for each individual for airflow, temperature, and lighting for 50% of the non perimeter, regularly occupied areas. (1 point)	1				**1**		not in estimate		
IEQ Credit 7: Thermal Comfort	Comply with ASHRAE Standard 55-1992, Addenda 1995 for thermal comfort standards including humidity control within established ranges per climate zone	1	**1**				Standard Practice			
	Install a permanent temperature and humidity monitoring system configured to provide operators control over thermal comfort performance and effectiveness of humidification and/or dehumidification systems in the building.	1				**1**				

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IEQ Credit 8: Daylight and Views	Achieve a minimum Daylight Factor of 2% (excluding all direct sunlight penetration) in 75% of all space occupied for critical visual tasks, not including copy rooms, storage areas, mechanical, laundry, and other low occupancy support areas. Exceptions include those spaces where tasks would be hindered by the use of daylight or where accomplishing the specific tasks within a space would be enhanced by the direct penetration of sunlight.	1		**1**			Design Issue			
	Direct line of sight to vision glazing while seated from 90% of all regularly occupied spaces, not including copy rooms, storage areas, mechanical, laundry, and other low occupancy support areas	1			**1**		Design Issue			
IEQ Credit 9: Acoustic Environment/ Noise Control	Minimize environmental noise through appropriate use of insulation, sound-absorbin materials and noise source isolation.	1	**1**							
IEQ Credit 10: Facility in-Use IAQ Management Plan	1) Develop an air quality action plan to include scheduled HVAC system cleaning 2) Develop an air quality action plan to include education of occupants and facility managers on indoor pollutants and their roles in preenting them 3) Develop an air quality action plan to include permanent monitoring of supply and return air, and ambient air at the fresh air intake, for carbon monoxide (CO), carbon dioxide (CO2), total volatile organic compounds (TVOCs), and particulates (including PM10)	1			**1**		Depends on FM requirements			

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FACILITY DELIVERY PROCESS										
Facility Delivery Credit 1: Holistic Delivery of Facility	Choose team leaders that are experienced in holistic delivery of facilities	1	**1**							
	Train the entire team in holistic delivery process. The team must include all stakeholders in the facility delivery, including the users, the contracting staff, the construction representatives, project manager, and design/engineering team members.	1		**1**			need to meet with contracting staff			
	Identify project goals and metrics.	1	**1**					ongoing		
	Plan and execute charettes with team members at critical phases of the facility delivery.	1	**1**					ongoing		
	Identify and resolve tradeoffs among sustainability, first costs, life cycle costs and mission requirements through charettes and other collaborative processes.	2	**2**					Part of VE/Charette design process		
	Document required results for each phase of project deliverables that achieve the project goals and are measureable throughout the facility life span.	1		**1**				possible to complete during next phase…		

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CURRENT MISSION										
Current Mission Credit 1: Operation and Maintenance	Develop a facility operations and maintenance program to include: 1.) Commissioning instructions for all facility systems. 2.) Comprehensive facility operations and maintenance instructions for system operation, performance verification procedures and results, an equipment inventory, warrantee information, and recommended maintenance schedule. The instructions should include a comprehensive, preventive maintenance program to keep all facility systems functioning as designed. 3.) A periodic training program for occupants, facilities managers, and maintenance staff in all facility operations and maintenance activities. 4.) Instructions on sustainable cleaning and pest control practices. 5.) Develop a comprehensive site recycling/waste management plan.	2		**2**				SOW issue		
	Provide surfaces, furnishings, and equipment that are appropriately durable, according to life cycle cost analysis.	1	**1**				Standard Practice			
Current Mission Credit 2: Soldier and Workplace Productivity and Retention	Provide a high quality indoor environment to enhance user/occupant quality of life (QOL)	1	**1**				Standard Practice			
	Provide a highly functional work environment to promote user/occupant work productivity.	1	**1**				Standard Practice			
	Provide a healthy and safe work environment to sustain QOL and productivity.	1	**1**				Standard Practice			
FUTURE MISSIONS										

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Future Missions Credit 1: Functional Life of Facility and Supporting Systems	Identify how long the designed function is likely to occupy the current facility	1	**1**				YES! 50 Years!			
	Identify how long the envelope, structure, HVAC, plumbing, communications, electrical, and other systems are likely to last before requiring replacement or upgrade. Consider economic, functional and physical obsolescence.	1	**1**				Get with Estimating and Mechanical for Life Cycle Assumptions			
Future Missions Credit 2: Adaptation, Renewal and Future Use	Identify possible future uses for the facility, consider alternatives that expand the list of possible future uses. AND Design the building to accommodate as a wide range of future uses, as practical. AND Design the installation of building systems to accomodate foreseeable change with a minimum amount of disruption, cost, and additional materials.	1		**1**			Design Issue			
	Build the smallest facility necessary to meet current mission functional requirments, using the most efficient shape and form, while taking into consideration expansion capabilities and potential future mission requirements. AND Design the facility for recycling of materials and systems.	1			**1**		Site Design Issues will probably limit expansion capabilities			
CREDIT TOTALS		**100**	**31**	**16**	**19**	**34**				

SPiRiT CERTIFIED: Bronze: 25-34 Points; Silver: 35-49 Points; Gold: 50-74 Points; Platinum: 75+ Points

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Command and General Staff College

Ft. Leavenworth, Kansas

Perkins & Will, Inc.

Preliminary Building Code Analysis

April 15, 2002

Schematic Design DRAFT

CODE REVIEW

1 Listing of Applicable Codes and Regulations

The project will address current Building Code and ADA accessibility requirements as well as standards.

The following Codes and Standards will apply:

Building Code:	Uniform Building Code 1997 Edition
Fire Prevention:	Military Handbook 1008C – Fire Protection for Facilities Engineering, Design and Construction, 10 June, 1997 National Fire Protection Association (NFPA 101)
Mechanical Code:	Uniform Mechanical Code 1997 Edition (?)
Electrical Code:	National Electrical Code (?)
Plumbing Code:	
Accessibility:	Americans With Disabilities Act Accessibility Guidelines
Other:	OSHA Regulations

Rules and Regulations of the U.S. Department of Labor.

2 Building Code Review

Building Classification and Limitations

Occupancy Classification:	Mixed Use		UBC 302
	Group A-1	Auditorium > 1,000 people + stage	UBC 303.1.1
	Group A-2.1	Entry/Auditorium Foyer	UBC 303.1.1
	Group B	Educational above 12th Grade	UBC 304.1

Construction Classification: Type II-FR

Allowable Areas - Mixed Occupancy:

Building area =	36 467.53 m²	(392,537gsf)	
Max. floor area (2nd Floor) =	10 545.07 m²	(113,506 gsf)	
Allowable max. floor Type II FR / B Occ.:			
Base area =	3623.21 m²	(39,900 gsf)	UBC Table 5-B
Two side yards - 50% increase =	5560.24 m²	(59,850 gsf)	UBC 505.1.2
Sprinklered - 100% increase (≥ 2 stories) =	11 120.49 m²	(119,700 gsf)	UBC 505.3
Total allowable floor area - B Occupancy:			
Multi-story buildings - 100% increase =	22 240.99 m²	(239,400 gsf)	UBC 504.2
Allowable max. floor Type II-F.R. / A1 Occupancy (Auditorium):			
Base area =	2777.80 m²	(29,900 gsf)	UBC Table 5-A
Three side yards - 100% increase =	5555.60 m²	(59,800 gsf)	UBC 505.1.2
Sprinklered - 100% increase (≥ 2 stories)	11 111.20 m²	(119,600gsf)	UBC 505.3

Preliminary Building Code Analysis

April 15, 2002

Schematic Design DRAFT

Total allowable floor area Type II-F.R / A-1 Occupancy (Auditorium):			
Multi-story buildings - 100% increase	22 222.41 m²	(239,200 gsf)	UBC 504.2
Allowable max. floor Type II-F.R. / A2.1 Occupancy (Great Hall):			
Base area =	2777.80 m²	(29,900 gsf)	UBC Table 5-A
Three side yards - 100% increase =	5555.60 m²	(59,800 gsf)	UBC 505.1.2
Sprinklered - 100% increase (≥ 2 stories)	11 111.20 m²	(119,600gsf)	UBC 505.3
Allowable Height:	A-1: 4 stories max. B : 12 stories		UBC Table 5-B

Construction Fire Resistive Requirements UBC Table 6-A, UBC Table 5A

A-1 Occupancy – Type II-FR Construction

Structure:		
Structural Frame:	2 Hour	
Walls:		
Bearing Walls:		
Exterior:	4 Hour	
Interior:	2 Hour	
Non-bearing Walls:		
Exterior:	4 Hour less than 5 feet 2 Hour less than 20 feet 1Hour less than 40 feet NR elsewhere	
Permanent Partitions:	NR	MH1008C-2,1,2
Shaft Enclosures:	2 Hour	
Exterior Doors and Windows:	Not permitted less than 5 feet Protected less than 20 feet	
Floors and Floor/Ceilings:	2 Hour	
Roof & Roof/Ceilings:	1 Hour	
Stairway Enclosure:	Not addressed yet.	

A-2.1 Occupancy – Type II-FR Construction

Structure:		
Structural Frame:	2 Hour	
Walls:		
Bearing Walls:		
Exterior:	4 Hour	
Interior:	2 Hour	
Non-bearing Walls:		

Preliminary Building Code Analysis

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Exterior:	4 Hour less than 5 feet 2 Hour less than 20 feet 1Hour less than 40 feet NR elsewhere	
Permanent Partitions:	NR	MH1008C-2.1.2
Shaft Enclosures:	1 Hour	
Exterior Doors and Windows:	Not permitted less than 5 feet Protected less than 20 feet	
Floors and Floor/Ceilings:	2 Hour	
Roof & Roof/Ceilings:	2 Hour	
Stairway Enclosure:	Not addressed yet	

B Occupancy – Type II FR Construction

Structure:		
Structural Frame:	2 Hour	
Walls:		
Bearing Walls:		
Exterior:	4-Hour less than 5 feet 2 Hour elsewhere	
Interior:	NR	
Non-bearing Walls:		
Exterior:	4 Hour less than 5 feet 2 Hour less than 20 feet 1 Hour less than 40 feet NR elsewhere	
Permanent Partitions:	NR	MH1008C-2.1.2
Shaft Enclosures:	2 Hour	
Exterior Doors and Windows:	Not permitted less than 5 feet Protected less than 10 feet	
Floors and Floor/Ceilings:	2 Hour	
Roof & Roof/Ceilings:	1 Hour	
Stairway Enclosure:	Not addressed yet	
Occupancy Separations:	A-1/B – 3 Hour A-2.1/B - 1 Hour A-1/A-2.1 - No separation required	UBC Table 3-B
Area Separations:	4 Hour fire resistive construction 3 Hour openings	

Egress Requirements

Egress Requirements are based on NFPA 101 - 2000
References are to NFPA 101-2000 unless indicated otherwise

Preliminary Building Code Analysis

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Schematic Design DRAFT

Notes:
1) The building is fully sprinklered.

A. Occupant Load

Occupant Load Factors:	Per Person - m² (SF)	Table 7.3.1.2
Fixed Seating Areas	No. of fixed seats	
Waiting Areas	0.65 (3)	12.7.1.2
Classrooms	1.9 (20)	
Business	9.3 (100)	
Storage	N/A	

Occupant load Factor Notes:
1) Gross area unless noted otherwise.
2) Storage area occupancy based on max actual number of occupants.

B. Doors:

1)	Minimum Clear Width:	81 cm. (32 in)	7.2.1.2.3
2)	Min. Width Measurement:	10.1 cm (4”) projection permitted on hinge side	7.2.1.2.2

C. Stairways:

1)	Min Width	112 cm (44 in.) 91 cm (36”) (<50 persons)	Table 7.2.2.2.1(a)

D. Ramps:

1)	Min Width	112 cm (44 in.) 91 cm (36”) (<50 persons)	Table 7.2.5.2 (a)
2)	Max. Slope	1 in 12	
3)	Max. rise for a single ramp run	76 cm (30 in.)	

D. Arrangement of Means of Egress:
New Business Occupancies:

1)	Dead-end corridor	≤15 m (50 ft)	38.2.5.2, Exception
2)	Common path of travel	30 m (100 ft)	38.2.5.3, Exception 1
3)	Travel distance to exits	91 m (300 ft)	38.2.6

E. Corridors:
New Business Occupancies:

1)	Fire resistance rating not required	38.3.6.1, Exception 3

AIA Document D101
Methods of Calculating Areas and Volumes of Buildings

There is no single standard for calculating areas and volumes of buildings. This document describes several options for calculation that may be at variance with applicable building code(s). Concurrence as to method(s) used and conformance to applicable code(s) is necessary.

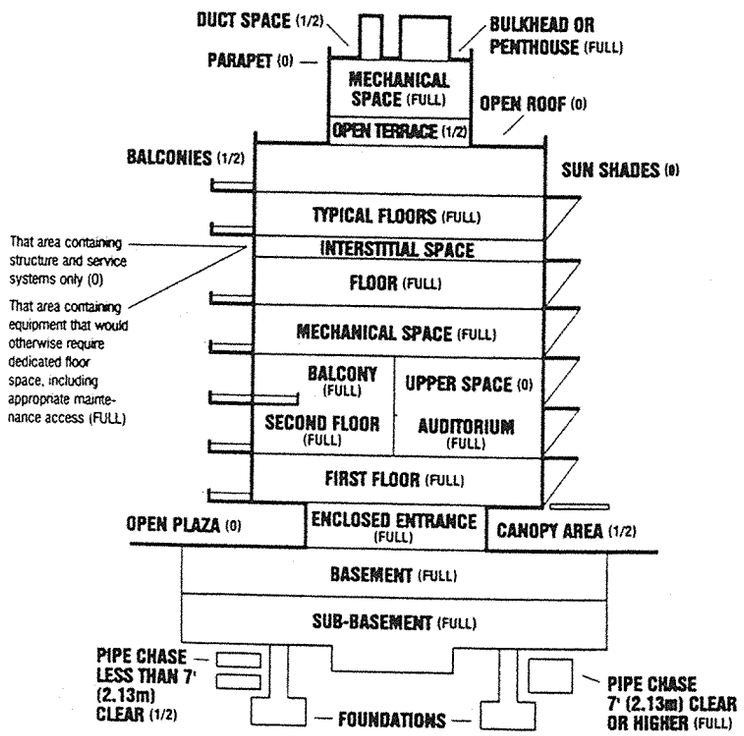
ARCHITECTURAL AREA OF BUILDINGS

The ARCHITECTURAL AREA of a building is the sum of the areas of the floors of the building, measured from the exterior faces of exterior walls or from the centerline of walls separating buildings. The architectural area includes basements, mezzanines, intermediate floors and penthouses, provided that these areas have a minimum of seven feet (2.13 meters) headroom height. Discretion is advised in calculating areas of interstitial space, such as mechanical spaces where live load requirements meet or exceed those permitted for habitation under local building codes.

- Paved or finished covered areas, such as open porches and similar spaces, shall have the architectural area multiplied by an area factor of 0.50.
- The architectural area does not include such features as utility chases (less than seven feet [2.13 meters] to any physical obstruction), exterior terraces, steps or eaves.

ARCHITECTURAL VOLUME OF BUILDINGS

The ARCHITECTURAL VOLUME (cubic volume) of a building is the sum of the products of the areas defined above, multiplied by the floor-to-floor height or floor-to-mean-finished-roof height.



ARCHITECTURAL AREA DIAGRAM

AIA D101.pdf

The STANDARD NET ASSIGNABLE AREAS are those portions of a building that are available for assignment as usable area or as rental area to an occupant.

OFFICE ASSIGNABLE AREAS

The USEABLE AREA is measured and calculated:

- from the center lines of common walls or partitions separating two or more USEABLE AREAS;
- to the inside surface of interior finishes of other walls or partitions separating such USEABLE AREAS from shared common areas, such as corridors, interior atriums and the exterior;
- without deduction for the building's functionally necessary elements, such as columns, projections and minor vertical floor penetrations for mechanical and electrical duct enclosures.

The RENTABLE AREA is measured and calculated:

- from the center lines of demising walls or partitions separating two or more RENTABLE AREAS;
- to the inside surfaces of the exterior walls; and
- including the pro-rata share of common areas, such as corridors and atriums;
- without deduction for the building's functionally necessary elements, unless it is a major vertical penetration such as a stairway, elevator or escalator shaft that is shared with the floors above or below.

The sum of all tenant's RENTABLE AREAS should equal the entire area of the building's floor(s) after deductions have been made for any major vertical penetrations shared with the floors above or below.

Additions may be made for major vertical penetrations such as stairways or other transportation elements when those penetrations are contained solely within the tenant's USEABLE AREA and RENTABLE AREA and the use is not shared with other tenants.

RETAIL ASSIGNABLE AREAS

RETAIL AREAS, sometimes referred to as Gross Leasable Area (G.L.A.), are computed by measuring from the exterior face of the building, store front or lease line, to the exterior face of the other outer building wall(s) or outer face of common area partitions and from the center line of walls between adjacent lease spaces, without deduction for the building's functionally necessary elements such as columns, projections and minor vertical floor penetrations for mechanical and electrical duct enclosures.

RESIDENTIAL LIVING AREAS

RESIDENTIAL LIVING AREAS include those spaces used for habitation in accordance with applicable building code(s) and ordinance(s). All areas are measured from the outside of the exterior walls.

Ft. Leavenworth											revised **7/09/02**, June 5, 02; 23 May 02,
Command and General Staff College Facility - 35% DESIGN PROGRAM											09 April 02,20 April 02, 2/12/2002
		Ext. Sq. Ft.			**Area**	**35% DESIGN**		**Extended**	**Total Area**		
No.	**Room Name**	**CHARETTE**	**Qty.**	**Cap.**	**Sq. Ft.**	**Sq. Ft.**	***Sq. Mtr.***	***Sq. Mtr.***	***Sq. Mtr.***		**Comments**
1.0	**Classroom and Education Areas**										
1.1	CGSOC Classrooms	95,680	92	16		93,512	94.43	8687.57			Access floor/reduced from 65sf to
											63.5sf/student
1.2	DLDC Faculty Development Classrooms	1,950	2	30		1,774	82.41	164.82			Access floor
1.3	CGSC Secure Classrooms	6,240	3	32		2,684	83.13	249.39			Access floor
	CGSC Secure Classroom/Comp Lab		1			882	81.86	81.96			Access floor
1.4	Secure Classroom Support/Admin	1,786	1			441	40.96	40.96			4 workstations
1.4.1	Defense Security Service Office		0	0	0	-	*0.00*				
	Subtotal Classrooms	105,656				99,294		9224.70			
Total Classrooms		105,656				99,294		**9224.70**			
1.5	CGSC Lab and Computer Area										
1.5.1	Dig.Leader Dev.t Center (DLDC)	7,000									
1.5.1a	Headquarters Section		0	0	0	-	*0.00*				
1.5.1b	Operations Section		0	0	0	-	*0.00*				
1.5.1c	Exercise Section		0	0	0	-	*0.00*				
1.5.1d	War Lab	2,414	1			1,895	*176.03*	*176.03*			Access floor
1.5.1e	Classrooms		2	16	888	1,776	*82.49*	164.98			Access floor
1.5.1f	ABCS Integration		0	0	0	-	*0.00*				
1.5.1g	Command and Control Lab		1			2,077	*192.95*	*192.95*			Access floor
1.5.1h	Faculty Training Lab		0	0	0	-	*0.00*				
	SSO Director Office		1	1		250	*23.19*	*23.19*			
	DLDC Director Office		1	1		216	*20.03*	*20.03*			
	Chief Office		5	1	121	604	*11.22*	56.1			
	Contract Worker		32	1	62	1,987	*5.77*	184.64			
	Non-contract worker		6	1	62	373	*5.77*	34.62			
	DLDC Receptionist		1	1		325	*30.22*	*30.22*			
	Conference Room		1			321	*29.82*	*29.82*			
	Copy/Fax		1			286	*26.53*	*26.53*			
	Secure Classroom Storage		1			361	*33.55*	*33.55*			
	Storage-DLDC		1			706	*65.57*	*65.57*			
	Secure Storage (small)		1			40	*3.69*	*3.69*			
	Storage (small)		1			80	*7.39*	*7.39*			
	Subtotal DLDC	9,414				11,295		1049.31			
	Internal Circulation (secure classrooms)					385		*35.78*			
	Internal Circulation (DLDC)					1,593		*148.00*			
Total DLDC		9,414				13,273		**1233.09**			
1.5.2	Battle Command Battle Lab (BCBL)	7,000	0	0	0	-	*0.00*				Deleted on March 8, 2002
1.5.4	Computer Lab	2,600	2	40	1027	2,055	*95.44*	*190.88*			Access floor, locate near DOET, level 2
1.5.5	International Officer Language Lab	1,040	1	16		771	*71.56*	*71.64*			
	Subtotal BCBL	10,640				2,826		**262.52**			
1.6	CGSC Auditorium/Lecture Room	18,960									
1.6.1	CGSOC Auditorium (1750 seats)		1	1750		19,995	*1857.63*	1857.63			seats reduced,main level+balcony
											programmed @ 2000 seats x 9sf
											minimum 18,900 sf
1.6.2	Foyer-prefunction	1,000	1			5,502	*511.13*	*511.13*			levels 2 & 3, main floor & lobby
1.6.3	Back of House		0	0	0	-	*0.00*				
	Stage		1			-	0	0			combined with overall area
	Stage Access Corridor		1			1,653	153.60	153.60			
	Flyhouse		1			-	0	0			combined with overall area
	Greenroom/Lounge		1			244	22.65	22.65			
	Dressing Room		1			156	14.50	14.50			
	Unisex Toilet		1			65	6.03	6.03			
	Loading Dock/Storage		1			132	12.27	12.27			
	Control Room Storage		1			402	37.37	37.37			
	Light Room		1			-	0	0			combined with sound control room
	Sound Control Room		1			397	36.87	36.87			
	Subtotal Auditorium	19,960				28,546		**2652.05**			
1.6.4	CGSOC Lecture Hall	5,200	1	375		4,368	*405.76*	405.76			
1.6.5	Foyer-prefunction	700	1			787	*73.10*	*73.10*			levels 2 & 3
	Control Room		1			80	7.39	7.39			
	Storage 1		1			137	12.76	12.76			
	Storage 2					71	6.56	6.56			
1.6.6	Rearscreen Projection	200	1			425	39.47	39.47			
	Subtotal Lecture Hall	6,100				5,867		**545.04**			
Total Academic & Educational Areas		**151,770**				***149,806***			**13917.40**		

Ft. Leavenworth											revised **7/09/02**, June 5, 02; 23 May 02,
Command and General Staff College Facility - 35% DESIGN PROGRAM											09 April 02,20 April 02, 2/12/2002
		Ext. Sq. Ft.			**Area**	**35% DESIGN**		**Extended**	**Total Area**		
No.	**Room Name**	**CHARETTE**	**Qty.**	**Cap.**	**Sq. Ft.**	**Sq. Ft.**	***Sq. Mtr.***	***Sq. Mtr.***	***Sq. Mtr.***		**Comments**
2.0	**Administrative Areas**										
2.1	CGSC Command Group Administrative Offices										
2.1.1	*CGSC Deputy Commandant (DC)*										
2.1.1a	Deputy Commandant	600	1	1		531	49.35	49.35			separate exit to prkg, & toilet
2.1.1b	Asst. Deputy Commandant		0	0	0	-	*0.00*				
2.1.1c	Command Group Staff	240	2	1	62	124	*5.77*	11.54			
2.1.1d	Aide	80	0	0	0	-	*0.00*				
	DCXO		1			232	21.59	21.59			
	Receptionist		1			245	22.73	22.73			
	ADC Dean		1	1		234	21.76	21.76			
	Subtotal Deputy Commandant (DC)	920				*1,367*		**126.97**			
2.1.2	CGSC Dean of Academics (DOA)										
2.1.2a	Dean	225	1	1		245	*22.79*	*22.79*			
2.1.2b	Executive Office	80	0	0	0	-	*0.00*				
2.1.2c	Secretary	80	0	0	0	-	*0.00*				
	Staff workstations		0	0	0	-	*0.00*	0			revised 6/13/02
	Subtotal (DOA)	385				245		**22.79**			revised 6/13/02
	DOA Support										
	Conference Room		1			243	22.61	22.61			
	Copy/Fax		1			114	10.55	10.55			
	Subtotal DOA Support	-				357		**33.16**			
2.1.3	CGSC Dean of Students (DoSA)										
2.1.3a	Deans Office	400	1	1		243	*22.56*	22.56			
2.1.3b	SGM		1	1		220	*20.43*	20.43			
2.1.3c	Receptionist	80	1	1		250	*23.22*	23.22			share w/ DOA (6/13/02)
2.1.3d	Assistant SGS	80	0	0	0	-	*0.00*				
	Subtotal Dean of Students (DoSA)	560				713		**66.21**			
2.1.4	CGSC Command Group Administrative Support										
2.1.4a	Conference Room	300	1	10		645	*59.93*	*59.93*			
2.1.4b	Copy/Storage/Coffee and CATERING	150	1			233	*21.61*	*21.61*			revised 6/13/02 (charette, catering =0 s
2.1.4c	Reception/Waiting	200	0	0	0	-	*0.00*				
	Storage		1			134	*12.46*	*12.46*			
	Food Prep		0			-	*0.00*	*0.00*			combine w/storage(6/13/02)
	Unassigned worksations		3	1		-	*0.00*	*0.00*			future growth
	Internal Circulation	489	1			-		0			
	Subtotal Command Group Support	1,139				1,012		**94.00**			
2.1.5	Deputy Commandant Boardroom	600	1			362	33.64	33.64			conference
2.1.5a	Rearscreen Projection	60	0	0	0	-	*0.00*				wireless solution
	Subtotal DC Boardroom	660				362		**33.64**			
2.1.6a	Visitor Coordination Officer		0	0	0	-	*0.00*				
2.1.6b	Visitor Coordination Staff		0	0	0	-	*0.00*				
	Subtotal										
Total Command Group Administrative Offices		***3,664***				**4,056**			**376.77**		

Ft. Leavenworth										revised **7/09/02**, June 5, 02; 23 May 02,
Command and General Staff College Facility - 35% DESIGN PROGRAM										09 April 02,20 April 02, 2/12/2002
		Ext. Sq. Ft.			**Area**	**35% DESIGN**		**Extended**	**Total Area**	
No.	**Room Name**	**CHARETTE**	**Qty.**	**Cap.**	**Sq. Ft.**	**Sq. Ft.**	***Sq. Mtr.***	***Sq. Mtr.***	***Sq. Mtr.***	**Comments**
2.2	**CGSC Academic/Staff/Student Affairs Administrative Offices**									
2.2.1	CGSC Directorate of Academic Operations (DAO)									
2.2.1a	Director	225	1	1		207	*19.21*	*19.21*		
2.2.1a'	Director Staff	225	0	0	0	-	*0.00*			
2.2.1b	Development & Assessment		0	0	0	-				
2.2.1b1	Division Chief	80	0	0	0	-	*0.00*			
2.2.1b2	Division Staff	1,200	0	0	0	-	*0.00*			
2.2.1c	Academic Plans & Policy		0	0	0	-				
2.2.1c1	Division Chief	80	0	0	0	-	*0.00*			
2.2.1c2	Division Staff	1,200	0	0	0	-	*0.00*			
2.2.1d	Curriculum Operations		0	0	0	-				
2.2.1d1	Division Chief	80	0	0	0	-	*0.00*			
2.2.1d2	Division Staff	560	0	0	0	-	*0.00*			
	Chief Office		1	1		128	*11.87*	*11.87*		revised 6/13/02
	DAO Offices		3	1	116	349	*10.82*	32.46		revised 6/13/02
	Reception		1	1		62	*5.77*	*5.77*		revised 6/13/02
	Support Staff		36	1	62	2,236	*5.77*	207.72		revised 6/13/02
	Unassigned		5	1	62	311	*5.77*	28.85		revised 6/13/02
	Subtotal (DAO)	3,650				3,292		***305.88***		revised 6/13/02
2.2.2	CGSC Directorate of College Staff (DCS)									
2.2.2a	Directors	225	1	1		220	*20.46*	*20.46*		
2.2.2b	Secretary	80	0	0	0	-	*0.00*			
2.2.2c	G1 (Chief)	80	1	1		129	*12.00*	*12.00*		small office (revised 6/13/02)
2.2.2d	G1 Staff	1,280	16	1	62	994	*5.77*	92.32		
2.2.2e	G3 Operations/Visitor Office (chief)	80	1	1		118	*10.95*	*10.95*		small office (revised 6/13/02)
2.2.2f	G3 Staff	400	0	0	0	-	*0.00*			4 cubes, 1 private
2.2.2g	(Visitor Coordination Officer) Relocated	150	0	0	0	-	*0.00*			(Relocated to Command
2.2.2h	(Visitor Coordination Staff) Relocated	160	0	0	0	-	*0.00*			Group 2.1.6a&b)
2.2.2i	G4 Logisitics (chief)	80	1	1		124	*11.48*	*11.48*		revised 6/13/02
2.2.2j	(G4 Staff Relocated)	100	0	0	0	-	*0.00*			combined w/ 3.3.3
2.2.2k	Resource Management (chief)	80	1	1		128	*11.93*	*11.93*		revised 6/13/02
2.2.2l	Resource Management Staff	240	1	1		62	*5.77*	*5.77*		(was 3 staff)revised 6/13/02
	Registrar Office (Chief)	80	1	1		131	12.19	12.19		
	Registrar Staff	240	4	1	62	248	5.77	23.08		
	Reception		1	1		62	*5.77*	*5.77*		share w/DOA-revised 6/13/02
	DCS Offices		0	0		-	*0.00*	*0.00*		revised 6/13/02
	Support Staff		0	1		-	*0.00*	0.00		
	Unassigned workstations		5	1	62	311	*5.77*	28.85		revised 6/13/02
	SGS (Chief)	80	1	1		119	*11.09*	*11.09*		revised 6/13/02;level 4
	Subtotal DCS	3,355				2,647		***245.89***		revised 6/13/02
2.2.3	CGSC Directorate of Student Affairs (DSA)									
2.2.3a	Director	450	0	0	0	-	*0.00*			
2.2.3b	US Student Division (USSD) Chief	80	0	0	0	-	*0.00*			
2.2.3c	USSD Assitant Division Chief	80	0	0	0	-	*0.00*			
2.2.3d	USSD Staff	400	0	0	0	-	*0.00*			
2.2.3e	Inter. Officer Student Div. (IOSD) Chi	80	0	0	0	-	*0.00*			
2.2.3f	IOSD Assistant Division Chief	80	0	0	0	-	*0.00*			
2.2.3g	IOSD Staff	320	0	0	0	-	*0.00*			
	DSA Staff - US		4	1	62	248	5.77	23.08		
	DSA Staff - International		3	1	62	186	5.77	17.31		
	DSA International Distribution (Reception)		1	1		421	39.10	39.10		revised 6/13/02
	Chief Office (Int'l/US)		1	1		127	11.79	11.79		revised 6/13/02
	SOF Director Office		1	1		218	20.26	20.26		
	SOF Staff		1	1		62	5.77	5.77		
	Unassigned		1	1		62	*5.77*	*5.77*		revised 6/13/02
	Subtotal DSA	1,490				1,325		***123.08***		revised 6/13/02
2.2.4	CGSC Academic/Staff/Student Affairs Administrative Support									
2.2.4a	Conference Room	300	1	10		219	*20.39*	20.39		
2.2.4b	Copy/Storage/Coffee	150	1			166	*15.41*	15.41		
2.2.4c	Reception/Waiting	200	0	0	0	-	*0.00*			
	Storage		1			112	*10.36*	*10.36*		revised 6/13/02
	DCS/DAO Copy/Fax		1			154	*14.33*	*14.33*		revised 6/13/02
	Subtotal Command Group Support	650				651		**60.49**		
	Internal Circulation	1,813	0			6,150		571.33		revised 6/13/02;admin levels 2 & 3
Total Acad/Staff/Student Affairs Admin Offices		**10,958**				**14,065**			**1306.67**	revised 6/13/02

Ft. Leavenworth											revised **7/09/02**, June 5, 02; 23 May 02,
Command and General Staff College Facility - 35% DESIGN PROGRAM											09 April 02,20 April 02, 2/12/2002
		Ext. Sq. Ft.			**Area**	**35% DESIGN**		**Extended**	**Total Area**		
No.	**Room Name**	**CHARETTE**	**Qty.**	**Cap.**	**Sq. Ft.**	**Sq. Ft.**	***Sq. Mtr.***	***Sq. Mtr.***	***Sq. Mtr.***		**Comments**
2.3	***Combined Arms Doctrine Directorate (CADD)***										deleted on March 8
Total CADD		5,244									
2.4	***CGSC Dept. of Maneuvers & Support***										
2.4.1	CGSC Dept. of Maneuvers & Support										
2.4.1a	Director	225	1	1		235	*21.85*	*21.85*			
2.4.1b	Director Staff	480									
2.4.1b'	NCO		2	1	62	124	*5.77*	11.54			
	Editor		1	1		62	*5.77*	*5.77*			
	Curriculum Developer		2	1		124	*5.77*	11.54			
	Unassigned		6	1	62	373	*5.77*	34.62			
2.4.1c	Instructors	6,400	80								revise per 2 & 4 person off.
	2 staff office		12	2	182	2,184	*16.91*	202.92			
	4 staff office		15	4	359	5,380	*33.32*	499.8			
2.4.1d	Committee Chiefs	480	8	1		1,362	*15.82*	126.56			
2.4.1e	Combat Reference Resource	320	0	0	0	-	*0.00*				
2.4.1f	German Liaison Officer (GLO)		0	0	0	-	*0.00*				
2.4.1g	Conference Room	300	1	10	177	177	*16.47*	*16.47*			
2.4.1h	Copy/Storage/Coffee	80	1			122	*11.34*	*11.34*			
2.4.1j	Waiting/Reception	150	1	4	308	308	*28.65*	*28.65*			
	Storage		1			68	*6.31*	*6.31*			
	Subtotal Maneuvers/Support	8,435				10,520		***977.37***			
	Internal Circulation	1,703	1			2,349		218.26			
Total Maneuvers/Support		10,138				12,870		***1,195.63***			
2.5	***CGSC Dept. of Sustainment***										
2.5.1	CGSC Dept. of Sustainment										
2.5.1a	Director	225	1	1		236	*21.90*	*21.90*			
2.5.1b	Director Staff	400									
2.5.1b'	NCO		1	1		-	*0.00*	*0.00*			share with reception
	Editor		1	1		62	*5.77*	*5.77*			
	Curriculum Developer		2	1	62	124	*5.77*	11.54			
	Info Tech Specialist		1	1		62	*5.77*	*5.77*			
2.5.1c	Instructors	4,240	53								revise per 2 & 4 person off.
	2 staff office		8.5	2	178	1,514	*16.55*	140.675			
	4 staff office		9	4	358	3,220	*33.24*	299.16			
2.5.1d	Committee Chiefs	160	5	1	133	666	*12.38*	61.9			
2.5.1e	Conference Room	300	1	10		118	*11.00*	*11.00*			
2.5.1f	Copy/Storage/Coffee	80	1			89	*8.31*	*8.31*			
2.5.1g	Waiting/Reception	150	1	4		311	*28.87*	*28.87*			
	Subtotal Sustainment	5,555				6,403		**594.90**			
	Internal Circulation	1,111	1			1,062		98.67			
Total Sustainment		6,666				7,465		**693.57**			

Ft. Leavenworth											revised **7/09/02**, June 5, 02; 23 May 02,
Command and General Staff College Facility - 35% DESIGN PROGRAM											09 April 02,20 April 02, 2/12/2002
		Ext. Sq. Ft.			**Area**	**35% DESIGN**		**Extended**	**Total Area**		
No.	**Room Name**	**CHARETTE**	**Qty.**	**Cap.**	**Sq. Ft.**	**Sq. Ft.**	***Sq. Mtr.***	***Sq. Mtr.***	***Sq. Mtr.***		**Comments**
2.6	***CGSC Dept. of Strategy***										
2.6.1	CGSC Dept. of Strategy										
2.6.1a	Director	225	1	1		235	*21.85*	*21.85*			
2.6.1b	Director Staff	400									
2.4.1b'	NCO		1	1		62	*5.77*	*5.77*			
	Editor		1	1		62	*5.77*	*5.77*			
	Curriculum Developer		2	1	62	124	*5.77*	11.54			
	Unassigned		8	1	62	497	*5.77*	46.16			
2.6.1c	Instructors	6,320	79								revise per 2 & 4 person off.
	2 staff office		11.5	2	178	2,050	*16.56*	190.44			
	4 staff office		14	4	356	4,982	*33.06*	462.84			
2.6.1d	Committee Chiefs	240	4	1		691	*16.06*	64.24			
2.6.1e	Military Opns (MOOTWA)	800	0	0	0	-	*0.00*				
2.6.1f	Australian Liaison Officer (ALO)	80	1	1		176	*16.31*	*16.31*			
2.6.1g	Canadian Liaison Officer (CLO)	80	1	1		169	*15.68*	*15.68*			
2.6.1h	Joint Systems Division	480	0	0	0	-	*0.00*				
2.6.1i	Conference Room	300	1	10		177	*16.47*	*16.47*			
2.6.1j	Copy/Storage/Coffee	80	1			106	*9.82*	*9.82*			
2.5.1k	Waiting/Reception	150	1	4		321	*29.81*	*29.81*			
	Storage		1			68	*6.31*	*6.31*			
	UK Office		1	1		159	*14.73*	*14.73*			
	GLO Office	80	1	1		168	*15.63*	*15.63*			
	Subtotal Strategy	9,235				10,047		**933.37**			
	Internal Circulation	1,831	0		0	2,386		221.66			
Total Strategy		11,066				12,433		**1,155.03**			
2.7	***CSGC Dept. of History***										
2.7.1	CGSC Dept. of History										
2.7.1a	Director	225	1	1	235	235	*21.80*	*21.80*			
2.7.1b	Director Staff	400									
2.7.1b'	NCO		1				*0.00*	*0.00*			share with reception
	Editor		1		62	62	*5.77*	*5.77*			
	Curriculum Developer		2		62	124	*5.77*	11.54			
	Support		1		62	62	*5.77*	*5.77*			
2.7.1c	Instructors	4,800	60								revise per 2 & 4 person off.
	2 staff office		10	2	177	1,773	*16.47*	164.70			
	4 staff office		10	4	358	3,582	*33.28*	332.80			
2.7.1d	Conference Room	300	1	10	115	115	*10.64*	*10.64*			
2.7.1e	Copy/Storage/Coffee	80	1			89	*8.31*	*8.31*			
2.7.1f	Waiting/Reception	150	1	4		284	*26.42*	*26.42*			
	Committee Chief		5	1	135	674	*12.53*	62.65			
	Subtotal History	5,955				7,001		**650.40**			
	Internal Circulation	1,191	1			1,062		98.67			
Total History		7,146				8,063		**749.07**			
Total Faculty Offices and Administration		**35,016**				**40,831**			**3,793.30**		

Ft. Leavenworth											revised **7/09/02**, June 5, 02; 23 May 02,
Command and General Staff College Facility - 35% DESIGN PROGRAM											09 April 02,20 April 02, 2/12/2002
		Ext. Sq. Ft.			**Area**	**35% DESIGN**		**Extended**	**Total Area**		
No.	**Room Name**	**CHARETTE**	**Qty.**	**Cap.**	**Sq. Ft.**	**Sq. Ft.**	***Sq. Mtr.***	***Sq. Mtr.***	***Sq. Mtr.***		**Comments**
2.8	***CSGC Sister Services***										
2.8.1	Air Force Element (AFELM)										
2.8.1a	Director	225	1	1		229	*21.25*	*21.25*			
2.8.1b	Instructors/Staff	880	9	1	62	559	*5.77*	51.93			revised 6/13/02
2.8.1c	Receptionist	80	1	1			*0.00*	*0.00*			included in staff workstations
	Subtotal Air Force	1,185				788		**73.18**			revised 6/13/02
2.8.2	Marine Element (MCELM)										
2.8.2a	Director	225	1	1		217	*20.16*	*20.16*			
2.8.2b	Instructors/Staff	80	5	1	62	311	*5.77*	28.85			revised 6/13/02
2.8.2c	Receptionist	80	1				*0.00*	*0.00*			share w/ Navy, included w/ staff
	Subtotal Marine	385				528		**49.01**			revised 6/13/02
2.8.3	Navy Element (NAVELM)										
2.1.2c1	Director	225	1	1		219	*20.35*	*20.35*			
2.1.2c2	Instructors/Staff	560	8	1	62	497	*5.77*	46.16			
2.1.2c3	Receptionist	80	0	0	0	-	*0.00*				Share w/ Marine
	Unassigned workstation		0	0			*0.00*	0			revised 6/13/02
	Subtotal Navy	865				716		**66.51**			revised 6/13/02
2.8.4	CSGC Sister Services Support										
2.8.4a	Conference Room	300	1	10		412	*38.27*	*38.27*			
2.8.4b	Copy/Storage/Coffee	80	1			183	*17.00*	*17.00*			
2.8.4c	Waiting/Reception	150	0	0	0	-	*0.00*				
	Subtotal Support	530				595		***55.27***			
	Subtotal for Sister Services	2,965				2,626		***243.97***			
	Internal Circulation	356				1,180		109.65			
Total for Sister Services		**3,321**				**3,806**			***353.62***		
2.9	***CGSC Graduate Degree Programs (GDP)***										
2.9.1	Director	225	2	1	218	436	*20.27*	40.54			(1)command group, (1) CAS3
2.9.2	Assistants	160	4	1	62	248	*5.77*	23.08			locate in DCS group suite
2.9.3	Marshall Chair (MC)	225	1	1		220	*20.46*	*20.46*			locate in command group
Total (GDP)		**610**				**905**			***84.08***		
2.10	***Combined Arms Services Staff School (CAS3)***										
2.10.1	Combined Arms Services Staff School (CAS3)										
2.101a	Director	225	1	1		232	*21.55*	*21.55*			
2.10.1b	Director Staff (assistant)	240	3	1	62.1078	186	*5.77*	17.31			open office
2.10.1c	Committee Chiefs	240	3	1	118.188	355	*10.98*	32.94			
2.10.1d	Ops/Case	880	11	1	62.1078	683	*5.77*	63.47			open office
2.10.1e	Staff Leaders/DL Suites	9,000	30	1	165.764	4,973	*15.40*	462.00			
2.10.1f	Conference Room	300	1	10		227	*21.13*	*21.13*			
2.10.1g	Copy/Storage/Coffee	80	1			142	*13.23*	*13.23*			
2.10.1h	Waiting/Reception	150	1			217	*20.17*	*20.17*			
	Large Storage		1			328	*30.45*	*30.45*			
	Small Storage		1			193	*17.97*	*17.97*			
	Subtotal CAS3	11,115				7,537		**700.22**			
	Internal Circulation	2,223	0			3,097		287.74			
Total (CAS3)		**13,338**				**10,634**			**987.96**		
2.11	***CGSC Directorate of Educational Technology (DOET)***										
2.11.1	Director	225	1	1		195	*18.16*	*18.16*			
2.11.2	Division Chiefs	240	3	1	117.327	352	*10.90*	32.70			
2.11.3	Help Desk Office	300	1	2		259	*24.09*	*24.09*			2 walk-up sta.& waiting for 4
2.11.4	Technician Workroom	600	1	10		486	*45.12*	*45.12*			3 stations & 7 workbenches
2.11.5	Equipment Storage	200	0	0	0	-	*0.00*				
2.11.6	***Imaging Room gone***	200	0	0	0	-	*0.00*				(use tech benches)
2.11.7	Secure Storage Room	600	1			686	*63.69*	*63.69*			qty 2 combined sm
2.11.8	Conference Room	300	1	10		262	*24.37*	*24.37*			
2.11.9	Server Farm	400	1			888	*82.53*	*82.53*			Access Floor
2.11.10a	Staff	400									
2.11.10a'	Supply		1	1		62	*5.77*	*5.77*			
	Acquisition		1	1		53	*4.93*	*4.93*			
	Admin/Tech		1	1		58	*5.41*	*5.41*			
	VTC		2	1	60.1703	120	*5.59*	11.18			
	Network		8	1	59.3091	474	*5.51*	44.08			
	Tech		4	1	58.5557	234	*5.44*	21.76			
	Unassigned		1	1		62	*5.77*	*5.77*			
	Video N.O.C		1	4		402	*37.39*	*37.39*			Access Floor
	Network Storage		1			85	*7.91*	*7.91*			
	ISD Program		1	6		385	*35.76*	*35.76*			
	Coffee/Fax/Storage		1			75	*7.00*	7.00			
	Subtotal DOET	3,465				5,141		***477.62***			
	Internal Circulation	693	1			552		51.24			
Total (DOET)		**4,158**				**5,693**			***528.86***		

Ft. Leavenworth											revised **7/09/02**, June 5, 02; 23 May 02,
Command and General Staff College Facility - 35% DESIGN PROGRAM											09 April 02,20 April 02, 2/12/2002
		Ext. Sq. Ft.			**Area**	**35% DESIGN**		**Extended**	**Total Area**		
No.	**Room Name**	**CHARETTE**	**Qty.**	**Cap.**	**Sq. Ft.**	**Sq. Ft.**	***Sq. Mtr.***	***Sq. Mtr.***	***Sq. Mtr.***		**Comments**
2.12	***CGSC Reserve/National Guard***										
2.12a	United States Army Reserve (USAR)	80	0	0	0	-	*0.00*				locate in DCS group suite
2.12b	United States National Guard (ARNG	80	0	0	0	-	*0.00*				
	Total CGSC Reserve/National Guard	***160***									
2.13	***CGSC Study Groups***										
2.13a	Director	225	1	1		220	*20.45*	*20.45*			
2.13b	Division Chiefs	160	2	1	119.264	239	*11.08*	22.16			
2.13c	Assistant Division Chiefs	160	0	0	0	-	*0.00*				
2.13d	Staff-unassigned	1,120	14	1	62.1078	870	*5.77*	80.78			open office
2.13h	Conference	300	1	10		238	*22.14*	*22.14*			
2.13i	Copy/Storage/Coffee	80	1			144	*13.37*	*13.37*			
2.13j	Waiting/Reception	150	1	4		214	*19.90*	*19.90*			
	Unassigned Private Office		1	1			*0.00*	*0.00*			changed to SGS(6/20)
	Subtotal Study Groups	2,195				1,925		**178.80**			
	Internal Circulation	439	1			377		*35.00*			
Total Study Groups		***2,634***				**2,301**			***213.80***		
2.14	***Tenant Units/ Organizations***										
2.14a	Acquisition Executive Support (DLRO	160	0	0	0	-	*0.00*				locate in Dept. of Sustain't
2.14b	Webster University	80	0	0	0	-	*0.00*				locate in Dept. of Sustain't
	Total Tenant Units/ Organizations	***240***									
2.15	***TRADOC History Office***										
2.15a	Director	225									
2.15b	Division Chiefs (2@150)	160									
2.15c	Assistant Division Chiefs (2@120)	160									
2.15d	Staff (14@100)	1,120									
2.15h	Conference	300									
2.15i	Copy/Storage/Coffee	80									
2.15j	Waiting/Reception	150									
	Subtotal										
	Internal Circulation	439									
	Total TRADOC History Office	2,634									
2.16	***CAC History Office***										
2.15a	Director	225									
2.15b	Division Chiefs (2@150)	160									
	Subtotal										
	Internal Circulation	439									
	Total CAC History Office	824									
3.0	**Support Areas**										
3.1	**Main Conference Areas**										
3.1.1	CGSC Main Conference Room	2,500	1			1,607	*149.33*	*149.33*			100 seats, revised to net
3.1.1a	Rearscreen Projection	200	1			204	*18.96*	*18.96*			
	Kitchen	-	1			161	*14.93*	*14.93*			
	Subtotal Main Conference Areas	2,700				1,972		***183.22***			
3.2	**Support Services (AAFES)**										
3.2.1	Bookstore	2,900	1			1,690	*157.05*	*157.05*			
3.2.2	Barber	362	1			508	*47.16*	*47.16*			
3.2.3	Cafeteria (food court)	8,000	1			5,566	*517.13*	*517.13*			
3.2.4	Laundry/Dry Cleaning	500	0	0	0	-	*0.00*				deleted, showers instead
	Bookstore Storage		1			570	*52.96*	*52.96*			
	Cafeteria Serving Kiosks		1			1,689	*156.91*	156.91			
	Kitchen/Storage		1			1,577	*146.50*	*146.50*			
	Kitchen Storage 1		1			71	*6.56*	*6.56*			
	Kitchen Storage 2		1			89	*8.23*	*8.23*			
	Subtotal Support Services (AAFES)	11,762				11,760		**1092.50**			
Total Support Areas		**14,462**				**13,732**			**1275.72**		

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		Ext. Sq. Ft.			**Area**	**35% DESIGN**		**Extended**	**Total Area**		
No.	**Room Name**	**CHARETTE**	**Qty.**	**Cap.**	**Sq. Ft.**	**Sq. Ft.**	***Sq. Mtr.***	***Sq. Mtr.***	***Sq. Mtr.***		**Comments**
3.3	**Storage**										
3.3.1	Classroom Services	5,772									
3.3.1a	Classroom Services/Aquasis	150	1	1		124	*11.54*	*11.54*			
3.3.1b	Aquasis Workers	400	5	1	62.1078	311	*5.77*	28.85			workstations,share w/compact storage
3.3.1c	Vault Area		0	0	0	-	*0.00*				
3.3.1d	Map Room		1	1	236.375	236	*21.96*	*21.96*			lockable
3.3.1e	Distribution Counter		1	2	62.1078	124	*5.77*	*11.54*			14 LF
3.3.1f	Mail Box Room		1			1,250	*116.17*	*116.17*			1400 12"x12"x12" boxes
											/accessible/lockable
3.3.1g	Compact Storage		1			1,826	*169.65*	*169.65*			share w/ open office
3.3.1h	Flag Storage		0	0	0	-	*0.00*				
	Mail Room		1			230	*21.33*	*21.33*			
	Subtotal Classroom Services	6,322				4,101		381.04			
3.3.2	Directorate/G4 Storage	2,800	1	7		2,255	*209.49*	*209.49*			level 1&2-workstations,compact storage
3.3.3	Defense Printing Chief	80	0	0	0	-	*0.00*				
3.3.3	Defense Printing Workers	80	0	0	0	-	*0.00*				
3.3.3	Defense Printing Work Room	-	0	0	0	-	*0.00*				
	Subtotal Directorate/G4 Storage	2,960				2,255		209.49			
Total Storage		**9,282**				**6,356**			**590.53**		
3.4	**Community Support Spaces**										
3.4.1	Trophy Lounge	2,000	1		2000	2,061	*191.49*	*191.49*			near food prep
3.4.2	General Officer Prep Rooms	400	2	1	500	309	*14.34*	28.68			
3.4.3	Great Hall		1			1,975	*183.44*	183.44			
3.4.4	Link to C.A.R.L	300				968	*90.00*	90.00			
3.4.5	Prayer Room	500	0	0	0	-	*0.00*				moved to CARL @ SW corner
Total Community Support Areas		**3,200**				**5,312**			**493.61**		
Total Assignable Square Footage		**261,515**				257,497			**23922.32**		
Non-Assignable Spaces											
	General Building Circulation	**51,519**	1			70,428	*6543.00*	*6543.00*			
	Mechanical Rooms and Shafts	**10,819**				16,514	*1534.21*	*1534.21*			
	Electrical Rooms	**3,199**					*0.00*	*0.00*			included w/mech
	Communication Rooms	**1,600**					*0.00*	*0.00*			included w/tech closets
	General Building Storage	**1,200**				1,124	*104.40*	*104.40*			
	Network Hub Room	**1,000**	1			300	*27.91*	*27.91*			
	Receiving/Loading/Trash/Recycle	**1,400**	1			1,769	*164.36*	*164.36*			throughwall compactor
	Janitor/Housekeeping	**1,000**	1				*0.00*	*0.00*			dumpster ext.
	Public Toilets	**9,273**				7,990	*742.32*	*742.32*			
	Structure/Exterior Walls/Partitions	**16,880**	1			31,118	*2891.00*	*2891.00*			
	Showers/Lockers						*0.00*	*0.00*			included w/toilets
	Stairs						*0.00*	*0.00*			included w/general circulation
	Tech Closet					1,213	*112.73*	*112.73*			
Total Non-Assignable Spaces		**97,890**				130,458			**12119.93**		
Total Gross Building Area (assigned+non)		**355,647**				387,955			***36042.25***		
Net to Gross Efficiency		**72.5%**				**66.4%**					
	: TONE INDICATES AREAS IDENTIFIED DURING THE CHARETTE DESIGN PHASE THAT ARE RENAMED OR HAVE BEEN										
	COMBINED WITH OTHER PROGRAM AREAS DURING THE 35% DESIGN										

We believe the following record to be an accurate summary of decisions and related discussions. We will appreciate notification of exceptions to this record within 10 (ten) days of its receipt. Failing such notification, we will consider this a statement of fact in which you concur.

PROJECT		WRITTEN BY
Command and General Staff College - Ft. Leavenworth, KS		Ronald J. Reid
PROJECT NUMBER	**FILE NUMBER**	**DATE WRITTEN**
100200800	S:\30200800.01.20	April 26, 2002

Subject: Interim Progress Review Meeting
Date: April 22,23, 2002
Time: All Day

An on-board review meeting was held in the offices of Atkins Benham Inc, to review the status of the architectural floor plans and elevations of the building and to discuss issues as related to all design disciplines. For a list of attendees, refer to the attached transcription of the sign-in sheet.

1. The meeting began by Mr. Fernengel and Mr. Rolf reporting that the overall building program was reviewed with General Riley and General Huntoon last week. The design was supported with four (4) noted concerns:

a. Pond's appearance may be a problem due to stagnate water.

b. Windows on the west side of the building may cause extreme heat during the summer months.

c. Lack of a "private and secured" entrance to the back of the auditorium for speakers.

d. Still some concern that the ravine side of the buildling not appear as an Warehouse or mill building.

2. Dave Dimond and Ron Reid addressed the concerns:

a. Pond issue – The pond is a separate issue and project, however, a survey is underway to determine the amount of water and depth of silt in the two ponds. This information will provide data to use in conjunction with the possibility of using the geothermal system in the ponds. Everyone agrees that the best way to handle the small pond is to make it part of the large pond, (re-circulate the water, etc.) by removing the small levee separating them. A recommendation/decision will have to wait until after the survey is completed and this will probably best be handled during the Value Engineer study after the 35% submittal. The pond is outside of the project budget and Atkins Benham's scope. If the money can be made available to install the geothermal system in the pond, this would allow the draining of both ponds, removing the levee separating the ponds, dredging the silt and using it to fill part of the ravine and deepening the ponds so they would be healthier. This is a winning situation for everyone but the problem is that higher first costs are involved.

b. Window issue – Direct sunlight is not a concern as the angle of the glass and the shadows cast by the mechanical/electrical towers will keep it at a minimum. Also new manufacturing techniques (low E-coating, blockage of ultra-violent rays, etc.) will prevent the type of heat build-up that people experience in older facilities. Computer similuations will analyze the worst case scenarios during the year and provide more than adequate mechanical system capacity.

c. Private access is needed to the auditorium stage so that speakers do not have to walk thru the auditorium – Discussions were held regarding the glassed-in corridor on the plaza side of the auditorium in the current layout and it was decided that this corridor provided would suffice for this purpose.

d. Building appearance on the ravine side – The AE responded that they were aware of this concern. It was the consensus of the design team that the size of the windows in the instructors offices and the four glazing breaks in the at the cross corridors and the stairs would prevent the "mill appearance" of becoming a factor.

3. The next interim review session is scheduled on May 14, 15, and 16 at Perkins & Will's office. Dave Dimond will inform all parties of the agenda and provide hotel information and directions to their office. Subsequent to the meeting it appears necessary to change the meeting to the 13, 14, 15 of May. Additional briefings for General Huntoon and General Riley are tentatively scheduled for the 17th and 20th of May respectively.

4. The design team reported that the proposed building design is approximately 50,000 square feet over the Charrette report. Charles Gamble reported that the extra space would cost around $2.1M. The design team reported that the overage is approximately 12%. According to Dave Dimond, the cause of the overage is:

a. Force protection items – aligning the individual floor plates so that blast design was not required for overhangs.

b. Cafeteria – 3,500 square feet added to align floor plates and avoid overhangs.

c. Overhangs – 3,500 square feet for protection from the weather along walkways which wasn't in the original program.

d. Corridor sizes – Need to be wider due to the amount of student traffic.

e. Auditorium – The auditorium was programmed at 18960 sf with a 1000 sf lobby which is inadequate. Current design recommendations for this auditorium would be 20,300 for the auditorium and stage and 6,000 sf of prefunction area. The life safety code (NFPA 101) looks at prefunction spaces utilizing 3 sf per person. The square footage programmed for the auditorium toilets was lumped in with the number for the entire building. None of which appears adequate. The toilets for the auditorium will have to be increased in size to handle the auditorium exiting load.

f. Offices – Went from cubicles to fixed walls because the instructors cannot counsel students adequately without privacy.

g. DLDC – 16,000 square feet which wasn't in the program and they are still 1850 sf short of need space.

5. Christine Hendzhik (and others) felt that the additional square feet will be difficult to get approval due to other project overruns within DOD. Approval would be difficult even if funds are under the PA. DA would be more likely to reduce the area to take advantage of additional savings to use elsewhere. The 1391 document will be the binding document. Note: the square footage issue could not mentioned during the briefing with General Riley and Huntoon the previous week since the analysis on the new footprint was not complete at that time.

6. It was decided that the design team will document all extra spaces not included in the program and the design criteria which has forced the area increases. Mr. Fernengel directed all teams to look at all spaces to see where space can be cut without destroying the functionality of the building and get the footprint back down to the original scope. Mr. Fernengel proposed the following cutbacks:

a. Reduce the auditorium from 2,000 to 1,750 seats.

b. Reduce the backstage area by as much as possible.

c. Reduce all conference rooms and non-classroom spaces by 5-10%

d. Reduce the width of all corridors except in the classroom wing.

e. Reduce the Great Room, cafeteria, and trophy area

f. Reduce or possibly eliminating the DLDC area

g. Reduce all storage areas by 10%

h. Consider expansion after building is completed. This is an extremely difficult propostion due to the constraints of the site and adjacent buildings on this facility.

i. Delete lockers and showers from the design.

j. The distance learning suites will be 150 sf.

7. It was also noted that some areas were missing from the plan (Language Arts, bathrooms, rear screen projection room for Marshall Auditorium, IDF closets, etc.). The design team also pointed out that the Command Wing, General Staff offices, Auditorium areas and other areas excluding classrooms have Communication Room space missing. Break out working sessions were conducted to brainstorm plan reorganization alternatives. Design team will be investigating and incorporating possible alternatives while at the same time cutting area out of the building. Mr. Fenengle will travel to the offices of Perkins & Will on Wednesday, May 1, to review the cuts made to the floor plans. The design team is tasked with preparing a document outlining the areas of necessary increase over the program and the reasons therefore, and the areas which have been reduce below program.

8. The week long effort to reduce the building footprint and the analysis of the program is delaying other engineering disciplines from doing substantial work on the project. The design team is relooking manpower allocations and developing a recovery plan. The COE and design team may need to relook at deliverables for the 35%. No change at this point however.

9. Christine Hendzlik reported that the Independent audit of the construction cost performed by a Corps of Engineer's subcontractor was virtually the same as what Atkins Benham included in the Charrette Report.

10. Major Rich Heitkamp fax in a spread sheet which contained a list of force protection items with comments and questions associated with them. These items were discussed and it was an action item for the design team to provide responses to these items.

11. Force Protection Discussions:

a. Twenty-five meters was the established standoff for this project but Ft. Leavenworth wants us to consider the 100-meter standoff under higher threats and to look at how we can tie our efforts into this increased standoff.

b. ABI to layout new parking for 800 spaces, which need to be outside the 100-meter standoff distance.

c. Force Protection to be a combination of plant material, berms, boulders, fencing, and low walls and or planters.

d. The VIP parking spaces should be outside the 25 meters as much as possible even though security must be passed before parking in these spaces.

e. Gates or bollards are to be located at approximately the 100-meter standoff but are not a part of this project.

f. A truck turn around is to be provided at the loading dock area near the historic housing. A second turn around will also have to be added for the housing, which is new criteria and is not currently in the construction cost estimate. There needs to be a barrier between these two areas. There may be the possibility of moving or demolishing the historic house nearest this area.

g. Force Protection grates will be installed on the overflow structures from the pond.

h. The new security gate location is to be designed to have four lanes in and two lanes out. Space needs to be provided for the guardhouse but the house itself is not part of this project. At least two parking spaces need to be provided as well as turn around space. Force Protection site features are needed on both sides of the road.

12. Civil Discussions and issues:

a. Perkins and Will would like to see the overflow structure located under the cafeteria area of the building. This would involve removing the levee to make the small pond part of the larger pond. Ft. Leavenworth does not have a problem with that.

b. ABI and BWR are to locate parking for 800 spaces. This may include reshaping the existing parking north of Bell Hall, using the open space on either side of the ravine on the southeast side of the building, enlarging the parking lot on the south side of Stimson.

b. ABI and BWR are to locate spaces at Truesdale to replace the existing parking lot that is to be removed.

c. The loading dock area will need to provide space for at least 3 trucks.

13. Landscape discussions and issues:

a. The entry plaza area is to include locating the Lamp, the main flagpole, 70-80 spaces for country flags, parking for VIPs, and ceremonial space.

b. The entry plaza area is to be landscaped appropriately and fully irrigated. The rest of the site is to be irrigated only with a quick coupler system.

c. The ceremonial grove of trees contains approximately 15-20 trees. Matt Nowak at Ft. Leavenworth is in charge of these trees.

d. The Berlin Wall monument is laid out in an intentional East-West orientation.

e. The use of grasscrete may be required to provide fire truck access on the east side of the auditorium.

14. Geotechnical Report: Ron Reid reported his discussions with the Corps of Engineers on-site representative concerning the limestone cap being encountered. The on-site engineer indicated that the COE was considering the use of piers bearing on the limestone cap as opposed to the auger cast piles that are currently in the construction estimate. Ms. Hendzlik reported that the primary geotech point of contact was out of the office and she would follow up on the status of geotech report.

15. The 35% documents for the 4th street extension will be a 24-foot wide asphalt pavement with no curb and gutter but with 10-foot shoulders on a roadbed graded to be paved in the future with a 54-foot back to back curb and guttered roadway with 4-foot shoulders. The storm drainage will not include curb inlets.

16. The Stimson Street realignment will be a 26-foot back to back curb and guttered street with NO shoulders.

Breakout group discussions . . . .

Classroom XXI

(Rolf, Wale, Ziebarth, Scharrer, and Dolan)

1. The current layout of the Classroom XXI is tight, but it will work. To maximize the space, Mr. Lynn Rolf directed Jeff Ziebarth to:
    a. Delete the countertop supporting the printers and coffee pot
    b. Move the printer to the sidewall (computer area)
    c. Delete the coffee pot entirely
    d. Consider adding a floor to ceiling cabinet behind the door with storage shelves
2. The plasma screens will probably be recessed in the wall. Perkins & Will will create a sectional view of the front wall and show:

   a. Two (2) 72" diagonal Plasma screens – Final rough-in must support easy replacement of a future screen of a different size (large trim molding that can be reworked), servicing, and heat dissipation.
   b. Mounting height of each screen at 42" AFF (P&W to allow a large trim molding to permit a screen size swap out in the future)

3. The teaching wall will have a horizontal sliding marker board. The size was estimated at 72" (w) x 36" (h). The support track must run the entire width of the front wall to permit the board to be used with, or in place of, the plasma units. It was determined that a vertical marker board system would not work due to the front wall camera.
4. P&W will specify a recessed cavity between the two (2) plasma screens for the student camera. The size of the cavity needs to be researched, but it is believed to be 12" (w) x 12" (h) x 12" (d). The bottom of cavity will be at eye level (approximately 42" to 48" AFF).
5. Add an electric screen (for non-staff use of the room on weekends and evenings). The screen should be motorized and recessed in the lay-in ceiling. The screen will be controlled via the touch panel and wall switch according to Mr. Fernengel. The switch should be located out-of-camera viewing but still accessible from the front of the room. The screen will be sized according to each room's dimension.
6. Microphones will be fixed (with a disconnect) to the student tables. The intent is to provide a thin-line (12" or 18") gooseneck with a semi-direct microphone. One (1) mic will serve two (2) students. The mics will probably be a push-to-talk system to minimize background noise and idle talk. All mics will be digitally filtered and tied into an automixer with touch screen controls. Mr. Rolf requested disconnects at the floor and possibly the tabletop for each microphone.
7. The lighting system will be as follows:
   a. Four (4) zones with independent dimming
   b. Uniform lighting on all walls for good contrast between walls and students – minimize shadows
   c. No direct lighting on the plasma or motorized screens
   d. 30 degree front lighting will be required on the instructor at both the control station and the corner of the front wall (careful, do not block the camera or have direct light on the plasma screens)
   e. RS-232 control interface to dimmer panels for low voltage interface – The touch screen will control the lights
   f. Doyle Magnus suggested using light fixtures specifically designed for VTC applications.
8. The computer furniture is undecided (portable tables vs. built-in). However, Mr. Rolf is leaning towards a 24" deep table with a pullout keyboard and a wall mounted, flat screen, monitor – to free up the tabletop for paperwork. The furniture must support the CPUs.
9. The HVAC system should be designed with low volume supply vents and no vibration. The target noise level is 35 dB. The STC level should be 50 from room-to-room and room to corridor.

IDF Closets, Cable Tray, and Sleeves

(Scharrer and Kerr-Grant)

1. The tray will be routed in corridors – routing was laid out on the drawings. Coordination of the tray, sprinklers, HVAC system, etc. will have to be carefully coordinated.
2. The IDF wiring closets must be 11' x 7' with adequate power, air conditioning, grounding, VCT flooring, etc. Chris provided Andrew with a typical plan view of an IDF closet.

Marshall Auditorium

(Wale, Ziebarth, and Dolan)

1. It was determined that 12' of depth is required as a minimal distance in the projection room to support rear projection (Wale requested 14' if possible). This is based on a screen size of 12' (h) x 16' (w). The screen should be mounted at 6' AFF with a ceiling height of 24'.

2. Conduits will be required to connect floor boxes to the projector.
3. No discussion occurred regarding how to hide the speakers or where input locations are needed.
4. Due to the square footage concerns, the rear screen projector system may be replaced with either a large LED display or a front projector system. Mr. Rolf is against the front projector system, but will review the large LED displays to determine resolution, brightness, contrast, etc. Perkins & Will will design the space with a rear projection space until directed otherwise.

Mechanical Discussions:

(Andrew Kerr-Grant, Dale A. Bestgen, Shahrokh Azhdari, Chris Scharrer, Doyle Magnus)

1. A detailed HVAC ductwork layout of one classroom cluster was presented to determine the space requirements above the corridor ceilings to provide space for mechanical, electrical, communications and fire protection. Cut sheets of proposed water source heat pump and light fixtures were presented and it was decided that corridor ceiling height shall not be more than 2945mm (9'-8"). Considering the early stages of design, utilizing preliminary equipment load and not knowing the exact brand of heat pumps that would be supplied, it is wise to state that the ceiling height may vary a few inches and that this analysis applies to only the corridor and not the entire facility. The unit being looked at has a height of 21 inches and if you have 1 inch clear space above and below the unit, this 23 inches sets the maximum ceiling height.
    a. Floor-to floor height is 4800mm (15'-9").
    b. Structural depth required is 37-1/2". 30" for depth of beams and 7-1/2" for thickness of slab.
2. 16 small mechanical rooms serving and providing outside air and pumping requirements were discussed and minor adjustments were made to it's short dimension. An increase of 457mm (18") was made. These mechanical rooms to have 1220mm (48") wide door to open into the corridor. A single door will be used to enter the electrical closet. Both doors will open off the corridor.
3. Kitchen/fire riser assembly room was discussed and the location of 140 sm (1500sf) mechanical room and vertical shaft were determined. The size of the mechanical room indicated at 70sm (750 sf) is too small and 147 sm (1550 sf) is required.
4. In order to save on the overall mechanical room requirements, it is anticipated to locate atrium engineered smoke evacuation system (supply and exhaust utility fans) to be located on the roof.
5. The auditorium mechanical requirements were discussed. One option was to use space above the ceiling to house water source heat pumps and a catwalk would be required. This would allow us to have smaller mechanical room for the auditorium make-up air units. This option does not have great potential due to catwalk requirements. The other option is to provide one larger 140sm (1500sf) mechanical room to provide space for water source heat pumps and make-up air.
6. 157 sm (1665 sf) is required for the boiler room that is located on the third floor adjacent to the cooling towers.
7. The fire protection shaft connecting the lower level mechanical room, the boiler room and all floors, needs to be provided with full width access to the Corridor and the shaft is approximately 2.5m (8') wide.

Electrical Meeting:

1. Inscription on exterior wall will require accent lighting. Other areas requiring accent lighting, both inside and outside of the building need to be determined.

2. The guardhouse will not be part of the scope of work. No electrical will be required for this area other than street and parking lot lighting.

3. Additional electrical rooms are needed for the facility:

a. Two per floor will be required in the southwest Administration wing, southwest of the great hall. Electrical Room sizes to be approximately 3.7m X 1.8m (12'X6') and 1.5m X 2.5m (5'X8') per floor.
b. One 10 ft x 15 ft electrical room is estimated to be required for the large auditorium.
c. The electrical space shown for the classroom areas on the northwest side of the building on each floor, next to the mechanical room will be increased approximately 18" to the northwest and will be approximately 3.7m X 1.8m (12'X6'). Another electrical room is required for each section of 8 classrooms, on each floor and approximately 1.5m X 2m (5' x 6'-8") each. A potential location for the added electrical rooms is just southeast of the elevators. Two electrical rooms will then be provided for each group of 8 classrooms. The electrical load for the classrooms is quite heavy.

4. Corridor Lighting – There are two types of corridors along the classrooms: one along the exterior wall with views to the pond, and others internal between classrooms. During a discussion with Andrew Kerr-Grant, Shahrokh Azhdari, Chris Scharrer and Doyle Magnus, the following was discussed:
   a. The ceiling space above the internal corridor between the classrooms will be quite dense. The light fixtures in this corridor will need to be 24 inches from the cable tray that routes communication wiring above the ceiling. The cable tray will be on the northwest side of these corridors. 1' x 4' fixtures mounted lengthwise down the middle of the corridor will not quite meet the 24-inch separation, but are allowable under the circumstances.
   b. Since the corridors along the exterior wall are more decorative and visible from the outside of the building, a wall wash concept should be considered. The wall washers could serve a dual role of accenting the east-side wall and illuminating the corridor for circulation and egress.

5. Classroom Lighting – The following was discussed between Brian Dolan, Dave Dimond, Chris Scharer, and Doyle Magnus:
   a. The lighting in the room needs to meet two primary functions: classroom use with VDT screens, and video-teleconference room lighting. The more difficult of the two functions is video-teleconference room lighting because of the camera requirements for high vertical illuminance levels, low glare, and lighting of background walls.
   b. We will investigate the use of Mark Lighting, or products by other manufacturers specifically intended to be used in video-teleconference lighting applications.
   c. The classroom design, and lighting scheme is to meet TRADOC Classroom XXI criteria.
   d. The architects would like the system to be as non-cluttered as possible. Use of indirect lighting was encouraged.
   e. The controls for the lighting will be part of the audio-visual controls using AMX technology. The lighting controls will need to control the rooms individually, or in a group.
   f. Four zones of classroom lighting control were discussed as a possible solution: front left, front right, seating area, and perimeter.

Structural meeting:

1. The roof slope is ¼" per foot and the roof will slope in the east-west direction. The roof slope will change direction 30 degrees at Grid line 10.
2. The 4800 mm floor to floor height will be 4800 mm to the low point of the top of metal deck at the roof level.
3. Forty-two inch parapets will not be required if the rooftop equipment is kept more than 10'-0" clear form the outer edge of the building. The intent is that all rooftop equipment will be kept in the central portion of the building. The parapet height has not yet been determined.
4. Additional columns will be added at the midpoint of the Third Floor Boiler Room reducing the span from 12 meters to 6 meters.
5. The Cooling towers will be supported on a structural grid. The area below the cooling towers will not have additional columns at the midpoint of the 12 meter span but can be supplemented by additional columns as required along grid lines 26 and 28 indicated on the April 22 plans. This area has very tight office space below that cannot easily accommodate additional columns without sacrificing workstations.

Miscellaneous:

1. On-going Code Review and Occupancy calculations indicate that additional stairs/stair widths are required and are being currently being added and will be on the revised plans to be issued for the interim review on May 1.
2. Plumbing fixture calculations are requiring larger toilets than originally programmed and those additional fixtures are being applied to the revised drawings for review on May 1.
3. The boiler room will require a one-hour fire rated partition around it but the mechanical rooms will not require a fire-rated partition.
4. The construction of the 4 hour area separation wall required between the Classroom Wing and the Atrium was discussed and so was the 3 hour occupancy separation wall that is required between the Auditorium and the Atrium.

Interiors meeting:

1. Rick Fernengal, Toni Brungard and Marci Winters will be going to the Chicago Merchandise Mart during the week of July 8-12. Once the trip is authorized, Toni Brungard will schedule the trip. ABI will prepare a list of recommended furniture manufacturers/showrooms to visit and send to the CGSC for review. ABI will provide a preliminary schedule to Rick Fernengal before scheduling appointments with the appropriate persons.

2. Toni Brungard prepared a notebook of furniture brochures and reviewed them with Lynn Rolf and Rick Fernengal. The classroom furniture was discussed in depth. The following issues were discussed at the interim review. Some issues remain unresolved and will be researched during the trip to Chicago:

Classrooms

a. A decision has not been made on wall mounted or worksurface mounted monitors. This decision impacts the depth of the tables that are located along the wall.
b. The option of having markerboards and tackable wall panels over the computer tables is unresolved. If the monitors are table mounted, a minimum of 30" is recommended for the depth of the tables. There was a concensus between Lynn Rolf and Toni Brungard that the 30" would make it difficult to reach to wall surface. If the monitors are mounted on a rail, the worksurface could be reduced to 24". This dimension makes the wall more accessible, but the monitor could hinder the usefulness of the wall surface.
c. The location of the monitor also impacts the need for articulating keyboard trays. If the monitor is on the wall, there is enough space for the keyboard on the worksurface. More discussion needs to be held concerning the ergonomic benefit of keyboard trays. It is not recommended that the keyboard tray be used on a table more than 24" deep as it places the user too far from the monitor.
d. It is necessary for the tables to be moveable for flexibility in reconfiguring. Since there is no place to store tables when not in use, ABI will research stacking and folding tables. This feature is expensive and may not be worth the benefit.
e. More research will be done into built in versus freestanding tables at the perimeter.
f. It was decided that an overhead cabinet for storage of manuals and other materials on the wall between the folding partition and entrance would be adequate. This storage cabinet is estimated to provide 20 lineal feet of storage.
g. A work counter for the printer and coffee machine was eliminated. It was suggested that the dead space in one of the corners of the classroom could have built in storage including space for the printer.

Action Items:

1. Design team to reduce the gross area of the building. Primary effort to be by Perkins and Will. To be done by Wednesday, May 1.

2. Rick Fernengel to go to Minneapolis on Wednesday, May 1, to review floor plan revisions.

3. Provide responses to Force Protection comments and questions sent in by Major Heitkamp. Subsequent to the meeting these responses were emailed to the design team on April 26th.

4. Corps of Engineers to check on status of geotechnical report. Subsequent to the meeting, Christine Hendzlik reported that the geotechnical report will not be available before the 35% submittal. So without any preliminary information the construction cost estimate will continue to utilize the auger cast pile foundation system.

List of Attendees:

Chris Scharrer	Atkins Benham	913-684-2402
Jeff Wale	Atkins Benham	913-684-2402
Ron Reid	Atkins Benham	405-478-5353
Charles Gamble	Atkins Benham	405-478-5353
Doyle Magnus	Atkins Benham	405-478-5353
Bill Cooper	Atkins Benham	405-478-5353
Pat Morgan	Atkins Benham	405-478-5353
Chris Stearman	Atkins Benham	405-478-5353
Shahrokh Azhdari	Atkins Benham	405-478-5353
Brian Dolan	Atkins Benham	405-478-5353
Lance Benham	Atkins Benham	405-478-5353
Marci Winters	Atkins Benham	405-478-5353
Toni Brungard	Atkins Benham	405-478-5353
Denise Sidwell	Atkins Benham	405-478-5353
Dave Dimond	Perkins & Will	612-851-5101
Jeff Ziebarth	Perkins & Will	612-851-5104
Bill Lyons	Perkins & Will	612-851-5045
Andrew Kerr-Grant	Perkins & Will	612-851-5115
Carl Johnson	Bucher, Willis & Ratliff	816-363-2696
Rick Fernengel	CGSC	913-684-2960
Lynn Rolf	CGSC/DOET	913-684-2402
Jon Moilanen	CGSC	913-684-2905
Mike Wolf	DIS	913-684-8967
Dale A. Bestgen	Corps of Engineers	913-684-4317
Christine Hendzlik	Corps of Engineers	816-983-3269

We believe the following record to be an accurate summary of decisions and related discussions. We will appreciate notification of exceptions to this record within 10 (ten) days of its receipt. Failing such notification, we will consider this a statement of fact in which you concur.

PROJECT		WRITTEN BY
Command and General Staff College, Ft. Leavenworth, KS		Ronald J. Reid
PROJECT NUMBER	**FILE NUMBER**	**DATE WRITTEN**
100200800	S:\30200800.01.20	May 17, 2002

Subject: Interim Review Conference
Date: May 13, 2014
Time: All day

An on-board review meeting was held in the offices of Perkins & Will to review the status of the architectural floor plans and building systems and to discuss issues as related to all design disciplines as related to increasing the scope of the project.

Mr. Rick Fernengel began with opening remarks that the User reviews of the building layout was very positive. He related that it was the opinion of General Huntoon that the 372,000 square foot was too tight and that the square footage had to increase to provide for the functional requirements of the facility. The area increases is required for the additional staff and students that have been added to the project since the original program was done. The Generals briefing will focus on the square footage of the building and the cost increase to the facility.

The following are comments on the plans from the User Groups:

- AQUSASIS G4 indicates they need an additional 2000 sq.
- Verify the size of freight elevator to handle equipment and furniture
- SSO CR need to be 300 sf larger
- Add latrines to administration wing
- 2 & 4 person offices – each desk needs a side chair for counseling
- Order furniture for testing by end of FY
- Mock-up one classroom
- CAC History has 20 more people than before
- Increase stage depth by approximately 20 feet
- Marshall auditorium needs 12 foot minimum depth for rear projection room.
- Classroom Communication closets need to be 4'X9' minimum
- Possibly have red/black IT on 4th floor classrooms
- What is the actual cost of force protection items
- What is siteing of two 400 car parking lots
- The auditorium shall be 1750 seats

The14 June deadline is still required for an updated estimate that can be taken forward on July 1 for updating the 1391 and validation of the budget. The modified design guidance for June 14 is to focus on the floor plan, site plan, Force Protection, typical Classroom and the updated estimate. A narrative is required for June 14 although it need not be the complete DA. This partial Design Analysis should focus on describing systems not represented in the drawings in order that the Corps of Engineers can validate the construction cost estimate.

A separate section must be developed in the Design Analysis to address the report by the Corps of Engineers on the Dam. ABI will need to address what design criteria will be followed for analyzing the existing dam and on what technical criteria will be relied upon for the final design.

An inventory for the Hall of Fame artwork, plaques, etc needs to be done. Subsequent to the meeting the field investigation and inventory will begin the week of June 5.

Perkins & Will is to generate some concept classroom images for presentation to TRADOC. This could be in the form of a video conference but needs to be done in the next two weeks.

Each classroom and conference room will have motorized projection screens. These will be government purchased and installed by the general contractor. The installation costs will be added to the estimate.

A floor plan will be provided to AAFES during the week of May 20 so they can see the block of space they have to work with in laying out their operations.

MECHANICAL GROUP MEETING:

1. P&W to provide four vertical shafts, 1220mm by 2440mm each for supply, return, outside and relief air. These vertical shafts will be located on both ends of the auditorium and will be connected with a horizontal shaft on the back wall of auditorium. Supply air would be at two levels with one being at about 2440mm A.F.F. using sidewall grilles. The center of the auditorium would be served with round spiral exposed ductwork and round diffusers coordinated with the cloud ceiling. Storage on the other end of the auditorium would be air conditioned with tight humidity control to protect the musical instruments from being damaged. There would be curtain at the back of the stage that should not be moved around by the HVAC air supply. James E. Smith indicated that he would prefer for the outside air for the auditorium to be taken from the roof rather than the side louver set at 3 meters above finish floor as part of the force protection.

2. P&W to provide a dedicated 3660mm by 3660mm mechanical room on the third level of lecture hall with about 915mm by 3050mm fresh air louver and 3050mm x 915mm relief louver. Both would be on the north wall of the lecture hall. Ductwork shall be above the ceiling.

3. Southwest mechanical room to have an outside air shaft about 300mm deep and full width of mechanical room. Intake to continue from first floor all the way up to fourth floor.

4. ABI to provide P&W the square meter for eggcrate type ceiling required to be used under the balcony of first floor to be used as supply air grille for engineered smoke evacuation system. Both supply and exhaust fans to be located on the roof.

5. ABI to provide P&W the size of intake air hood for auditorium's outside air intake.

6. Shaft above elevator equipment room shall be utilized for routing kitchen exhaust air.

7. Lower level mechanical room on the north side shall have exterior double door for fire marshal access to riser assemblies.

CLASSROOM LIGHTING – The following is a summary of notes from meetings between Doyle Magnus (ABI) and Jeff Wale (ABS), and Doyle Magnus and David Dimond (P&W). It also includes comments from a brief presentation to Rick Fernengel, Lynn Rolf, Lance Benham, and others that were in the conference room at the time.

1. There are 4 different functions or "scenes" required in the classrooms:
   a. AV Presentations – Low light levels
   b. General Classroom Use – Medium light levels with wall washers
   c. Video Teleconferencing (VTC) – High vertical light levels on participants
   d. Map reading at a centrally located table – High horizontal levels in the middle of the room.
2. There should be 5 zones of separate lighting control:
   a. Rear 2/3 of general (indirect) lighting
   b. Front 1/3 of general (indirect) lighting
   c. VTC lighting
   d. Wall washers on two sides and the rear
   e. Wall washers at the front
   f. NOTE: A zone for spotlighting a speaker at a podium at the front of the room was determined to be unnecessary, and was deleted from the concept presented by Doyle Magnus. If a speaker/presenter is required to be well lighted, he could sit at the table in the middle of the U-shaped tables where there will be high vertical light levels.
3. We are looking at the use of a Lutron graphic-eye system to control the lights in each classroom. The lighting control system must interface with the Audio/Video system which uses either AMX or

Crestron controls. An RS232 connection is required between the lighting controller and the A/V system.

4. A drawing and narrative of the lighting system for the classroom will be required for the June 14th submittal.

MEETING WITH DOYLE MAGNUS, JEFF WALE AND CHRIS SCHARER

1. Each of the communication rooms serving the classrooms will have 4 cabinets. Four 120V, 30A circuits will be required for the communication room.
2. Provide a Technical Bus Ground (TBG) in each Classroom Comm. Rm. with #6 grounding conductor to each rack.
3. The power for each of two A/V racks in the Classroom Comm. Rm. shall be on the same electrical phase. See sheet TA412.
4. Depending on how the classified network is handled, it is anticipated that the cooling load for each Classroom Communication Room will be around 6,000 btuh. Jeff will confirm the heatload and get back to the team.
5. It is believed that more than one classroom can be fed from a single panelboard, even though Classroom 21 states that one panelboard is required for each classroom. We do not have space available for the facility to provide one per classroom. We will meet the intent of providing enough power and circuits to the classrooms.
6. We should plan on a 50 kVA UPS system for the Server room. This is to serve the equipment in the Server Room only. The other locations will be served with individual UPS units. This is recommended by Chris and Jeff. The UPS is OMA/OPA dollars and not MILCON.

MISCELLANEOUS LIGHTING NOTES:

1. David Dimond presented drawings that indicate special ceiling and wall treatments in several corridors. P&W will need to coordinate closely with ABI Electrical to determine an appropriate lighting concept for the corridors. The corridor lighting along the pond-side will need to also coordinate with the pattern of the exterior columns.
2. David Dimond will send Doyle a mark-up of composite drawings showing locations where accent lighting for artwork is required. It is anticipated that several corridors will be used to display plaques and artwork, in addition to atrium spaces.
3. Chris Scharer requested a low-voltage high-tech lighting system (using pendant or track MR16 lamps, etc.) in the Video NOC room. It was discussed that this room should be showcased as it contains the central control of the various VTC and audio/video systems for the facility. The wall on the corridor side should be glass to permit visitor viewing into the room from the corridor.

NOTES FROM MEETING WITH LANDSCAPE, CIVIL, FORCE PROTECTION

1. Carl Johnson stated that a generator or back-up power source would be needed for a lift station that is to be relocated near the east end of the building. Presently, we are considering the use of a generator for the atrium smoke removal fans. We could serve both loads from the same generator, but two automatic transfer switches would be required since one purpose is life safety (smoke removal system) while the lift station is a base requirement, and is not life-safety. The auto transfer switches for the lift station and the atrium should be inside the building, one for each.

2. A generator with pad of approximately 12 ft. x 14 ft. surrounded by fencing will be required at the east end of the building.

3. Two pad-mounted transformers will be required to serve the facility. They will require a pad of approximately 16 ft. x 24 ft. If located within 10 m of the facility, a blast wall should be provide with three side of fencing for force protection.

4. Doyle told Carl the concrete-encased ductbank for power into the facility is approximately 2 ft x 2 ft.

5. The site drawing is C101 and is available on the FTP site.

6. There will be an irrigation system, and there will be a need for landscape and walkway lighting.

7. The threat for the post was determined to be a 7-ton POV traveling at a speed of 40 mph.

8. A 20' clear zone is to be maintained around the building. No plant material taller than 12" is to be planted.

9. The 25 meter standoff was extended to 100 meters to encompass a threatcon of Delta.

10. Any outdoor utilities such as cooling towers, generators, etc. need to have a 9' chain link fence with wire on top around them. One side can be a solid wall for aesthetic reasons. If the fence is a decorative iron or steel fence then openings cannot be larger than 6".

11. The entry drive for the main plaza should consist of one access point.

12. The building will utilize a 10' x 60' trash compactor that will be located at the loading dock area. This does not meet force protection requirements but the 25 meter requirement will be waived.

13. A currently programmed security gate will be installed at the north service drive. ABI is to provide controls for the barrier and a camera.

14. An access card security gate with cameras is to be installed at the main entry drive to the plaza. A dumb gate is to be installed at the loading dock area by the auditorium. Two reasonably aesthetic dumb gates are to be installed along Stimson Road, and a traffic control gate is to be installed at the entrance to the 40-space parking lot by the auditorium.

15. The new guard shack along Stimson Road will be provided by the post. ABI needs to provide utilities for heat and air, male and female latrines, lighting, phone, and an actuator switch for a pop up barrier of some type further down the road if someone were to run through the gate. ABI to provide a barrier of some type in front of the guard shack, site lighting, some type of pop-up barrier further down the road, and a canopy with lighting that will cover four lanes. The fourth lane needs to have a canopy tall enough to accommodate a semi tractor trailer truck.

16. Force protection needs to be provided in the neighborhood to the south of Stimson Road.

17. Carl Johnson was to check into the possibility of lowering Stimson Road approximately 2 feet for force protection.

18. Force protection limits would start at the pond between the buffalo monument and the new building, extend to and along the parking lot north of Truesdale and connect to the north side of Truesdale. It would pick up on the south side of Truesdale and continue to Stimson Road where it will continue along the north side of Truesdale to the 40-space parking lot at the auditorium. It would then continue around the north side of this parking lot and wrap around and extend to the proposed parking lot to the south east of the building south of the ravine. The limits would also cross Stimson Road at Truesdale and continue through the back yards of the houses on the south side of Stimson Road. It would then go back across Stimson road and run along the edge of the proposed parking lot to the south east of the building south of the ravinve until it reaches the ravine. The limits will pick up on the other side of the ravine and connect into building 293. It will then start on the north side of building 293 and connect into the proposed retaining wall. At this point the post will pick up the force protection using jersey barriers that will stretch along the existing parking lot to the new security gate at the north service drive.

19. Force protection limits will consist of a combination of low walls, berms, boulders, trees, gates, and post and cable fencing. The section from the existing parking lot to the pond will become an architectural feature.

20. Areas for possible additional 800 parking spaces were identified.

21. The proposed cul-de-sac for the historic houses should be shifted closer to building 292.

22. The post will provide additional paving for widening the alley behind the historic houses to allow for 2 way traffic.

MEETING REGARDING THE LARGE AUDITORIUM, MARSHALL AUDITORIUM, AND OTHER SPACES (Andrew Kerr Grant (P&W), Shahrokh Azhdari (ABI), and Doyle Magnus (ABI):

1. The electrical room presently shown on A128 will move to the lower level by the mechanical room that serves the auditorium. The room on A128 will be needed by mechanical for a shaft. Doyle requested a 10 ft x 15 ft electrical room.
2. The ceiling in the large auditorium is planned to be exposed (painted black), with pendant sound baffles/reflectors.
3. Mechanical will utilize CO2 sensors to control the volume of air based on the number of occupants in the large auditorium.
4. Doyle requested a 6 ft x 8 ft electrical room, or a clear zone of about 22 linear feet for lighting and power panels near the stage of the large auditorium. The clear zone would need to avoid storage of materials and piping to a point about 4 ft. from the wall.
5. Doyle requested a space approximately 5 ft. x 6 ft. for an electrical room near the stage of Marshall Auditorium.
6. The Main Electrical room located at the east end of the first level will be relocated to avoid having a column in the middle of the room. The fire alarm control panel could go in this room. Double-doors will be located on one side, with another set of double-doors leading to the outside of the building from the Mechanical Room. A single door will be located on the other side of the room. Both doors of the Electrical Room will require to swing out and have panic hardware per NEC 110.26(C)(2).
7. The base does not require the electrical room to have an exterior door.
8. A motorized jib crane will be recommended a grid J/29 – Level 3, Sector 6 by the cooling towers.

MISCELLANEOUS POWER NOTES (5/13/02 and 5/14/02):

1. Rick Fernengel said that one model classroom will be built to finalize and verify the Classroom design.
2. due to distances, it may be necessary to install a remote lighting subpanel in each classroomarea. If necessary, wall board space may be available (depending on how much space is needed) in the Classroom Communication Rooms. Doyle will research the Lutron system to determine the lighting interface requirements.
3. Doyle/ABI will check codes to see if a second source of power can be used in lieu of a generator for the smoke removal system. Since two separate feeds serve the facility, this may be a possibility.
4. The fourth floor will require Red and Black Communication wiring. Only Black power is required on the fourth floor.
5. The technology budget includes the cost for all low voltage raceway including cable tray, conduits, and surface-mounted raceway (Wiremold). The new requirement for red (classified) data drops on the 4th floor and in the DLDC area will require additional funding (approximately 300 drops). Jeff will estimate the additional cost and forward the information on to Charles Gamble.
6. All classrooms are to meet Classroom XXI requirements, even the three in the SCIF area on the 2nd Level, south end.
7. Col. Lynn Rolf will check to see if all of the SCIF Classrooms are to be designed for VTC.
8. According to Col. Rolf, the following rooms, conference rooms and auditoriums will have VTC:
   a. Large Auditorium
   b. Marshall Auditorium
   c. Main Conference Room (next to Marshall Aud.)
   d. Deputy Commandant Office (small version of VTC)
   e. Conference Room adjacent to Deputy Commandant Office
   f. Large Conference Room in the Admin. Wing on the 2nd Floor, Southwest

9. DDLC War Lab will have simulators in which the users will build a box within the space of a remote command post, for example. The room will be an open plan with industrial type fluorescent lighting. The room will have a higher electrical requirement than a typical office.
10. DDLC Command/Control Lab – Col. Rolf said we should contact Steve Davis for a summary of the electrical requirements for this space. It will be similar to the War Lab. There will be computers and simulators, and Sun Sparkstations.
11. The Document Center location was not identified on the plans.

IT PRESENTATION BY CHRIS SCHARER AND JEFF WALE

Chris and Jeff walked the team through the IT technology drawings. The team supported the designs with the following comments:

13. Classroom XXI – Planview, elevations, and logical diagrams were reviewed. Accepted as presented with the following changes:
    a. Add nine (9) classified data drops (multimode fiber in conduit) to each fourth floor Classroom XXI. Lynn Rolf will confirm the secured cabling requirements. A classified IDF room may be required.
    b. Remove the contact switch (at the folding door) to auto combine/separate the AV system -- All combining functions will be done manually on system start-up.
    c. Move ceiling speakers from below ceiling to above (recessed) ceiling to prevent glare and line-of-site camera pick-up.
    d. The prologic 3-channel audio design (left, right, and center) was preferred over the 5.1 standard due to the sub-woofer concern.
    e. Lynn Rolf preferred the 6" raised floor instead of the 12" style.
    f. The 1391 report does not include the cost of the electric screens. Jeff will provide the cost estimate to Charles Gamble for installation cost only. The screens are government furnished from other funds.
    g. No audience response system is required.
14. Communication Rooms – Accepted as presented.
15. Video NOC Room – Planview and logical diagrams were reviewed. Changes to the design include:
    a. Add a Command Information channel to the line-up. This will permit a CG message to be broadcast to all locations.
    b. Add a return channel to Eisenhower video headend – This will permit any program originating within the new CGSC to be broadcast campus-wide.
    c. Add audio / camera function to and from each control station to permit "on system" support to the classrooms, Marshall auditorium, main conference room, and large auditorium. AUP (Acceptable Use Policies) were raised regarding when the NOC operations can interrupt classes, monitor conversations, and control remote cameras. Further discusses are needed.
    d. The square footage is too small – Chris will work with David Dimond on requirements.
    e. Chris requested a window wall for visitors.
16. Conference Rooms – The 1391 and the associated budget includes AV equipment for the Main Conference Room only. Lynn Rolf will have his staff inventory the existing AV equipment to determine what can be reused for the remaining conference rooms. The list should be forwarded to Jeff and Chris ASAP.
17. DLDC – Add classified fiber drops to each DLDC office.
18. Marshall Auditorium – The depth of the rear projection room must be 12'. Wale raised the concern of the support column taking away 2' of usable space. P&W to investigate.
19. IDF rooms – There are still some concerns regarding the locations of the IDF rooms:
    a. The SCIF IDF room on the first floor cannot be used as a general IDF closet. P&W will add a second IDF.
    b. P&W was asked to review and (if possible) move the IDFs in the staff office area to the center of the wing. The current location is within, but at the outside of the EIA limits.

c. Red (classified) IDF closet may be required on the fourth floor to support the new classified fiber drops. This space can be used to support the DLDC drops too.

ACTION ITEMS:

1. In the estimate change the elevators to one 2040 kg freight elevator and three 1590 kg passenger elevators.
2. ABI and P&W to review reducing the amount of fire shutters around the floor openings by classroom/office area on level 2,3,4. Will study possible solutions to verify compliance with code issues.
3. P&W to add another stair to support the population of the auditorium balcony and lecture hall.
4. P&W to add restrooms to the administrative area of the facility.
5. ABI to provide P&W internal roof drain line locations and sizes of drain lines. Subsequent the meeting this information was sent on May 7, 2002.
6. P&W to provide annotated interior perspectives and floor plans showing areas that have special wall, floor, and ceiling treatments and finishes.
7. Security meeting at Ft. Leavenworth tentatively scheduled for June 5 but was subsequently changed to June 7.
8. ABI to conduct field survey of artwork beginning week of June 5
9. Perkins & Will to generate classroom images for TRADOC by May 24.
10. ABI to provide P&W the open ceiling area required for engineered smoke evacuation system.
11. ABI to provide P&W size of intake air hood for auditorium.
12. ABI to provide a drawing and narrative of the classroom lighting system for the June 14 submittal.
13. P&W to provide mark-up drawings showing locations of artwork and plaques.
14. ABI to verify whether a generator is required for smoke evacuation system or whether second electrical feed will suffice.
15. Red & Black requirement on 4th floor will require additional funding for the new 300 drops and ABI will add this to the estimate.
16. Mr. Rolf to confirm the secured cabling requirements and whether or not a classified IDF room may be required on the 4th floor.
17. Mr. Rolf to have his staff inventory existing AV equipment that may be reused in conference rooms.

MEETING MINUTES
CGSC – Design Coordination Meeting at P&W – May 13, 2002

Electrical Notes – By Doyle Magnus

CLASSROOM LIGHTING – The following is a summary of notes from meetings between Doyle Magnus (ABI) and Jeff Wale (ABS), and Doyle Magnus and David Dimond (P&W). It also includes comments from a brief presentation to Rick Fernengel, Lynn Rolf, Lance Benham, and others that were in the conference room at the time.

1. There are 4 different functions or "scenes" required in the classrooms:
   a. AV Presentations – Low light levels
   b. General Classroom Use – Medium light levels with wall washers
   c. Video Teleconferencing (VTC) – High vertical light levels on participants
   d. Map reading at a centrally located table – High horizontal levels in the middle of the room.
2. There should be 5 zones of separate lighting control:
   a. Rear 2/3 of general (indirect) lighting
   b. Front 1/3 of general (indirect) lighting
   c. VTC lighting
   d. Wall washers on two sides and the rear
   e. Wall washers at the front
   f. NOTE: A zone for spotlighting a speaker at a podium at the front of the room was determined to be unnecessary, and was deleted from the concept presented by Doyle Magnus. If a speaker/presenter is required to be well lighted, he could sit at the table in the middle of the U-shaped tables where there will be high vertical light levels.
3. We are looking at the use of a Lutron graphic-eye system to control the lights in each classroom. The lighting control system must interface with the Audio/Video system which uses either AMX or Crestron controls. An RS232 connection is required between the lighting controller and the A/V system.
4. A drawing and narrative of the lighting system for the classroom will be required for the June 14th submittal.

MEETING WITH DOYLE MAGNUS, JEFF WALE AND CHRIS SCHARER

1. Each of the communication rooms serving the classrooms will have 4 cabinets. Four 120V, 30A circuits will be required for the communication room.
2. Provide a Technical Bus Ground (TBG) in each Classroom Comm. Rm. with #6 grounding conductor to each rack.
3. The power for each of two A/V racks in the Classroom Comm. Rm. shall be on the same electrical phase. See sheet TA412.
4. The cooling load for each Classroom Comm. Rm. is about 6000 btuh.
5. It is believed that more than one classroom can be fed from a single panelboard, even though Classroom 21 states that one panelboard is required for each classroom. We do not have space available for the facility to provide one per classroom. We will meet the intent of providing enough power and circuits to the classrooms.
6. We should plan on a 50 kVA UPS system in the Computer Room (hub/server area). This is recommended by Chris and Jeff.

MISCELLANEOUS LIGHTING NOTES:

1. David Dimond presented drawings that indicate special ceiling and wall treatments in several corridors. P&W will need to coordinate closely with ABI Electrical to determine an appropriate lighting concept for the corridors. The corridor lighting along the pond-side will need to also coordinate with the pattern of the exterior columns.

2. David Dimond will send Doyle a mark-up of composite drawings showing locations where accent lighting for artwork is required. It is anticipated that several corridors will be used to display plaques and artwork, in addition to atrium spaces.
3. Chris Scharer requested a low-voltage high-tech lighting system (using pendant or track MR16 lamps, etc.) in the Video NOC room. It was discussed that this room should be showcased as it contains the central control of the various VTC and audio/video systems for the facility. The wall on the corridor side should be glass to permit visitor viewing into the room from the corridor.

NOTES FROM MEETING WITH LANDSCAPE, CIVIL, FORCE PROTECTION

1. Carl Johnson stated that a generator or back-up power source would be needed for a lift station that is to be relocated near the east end of the building. Presently, we are considering the use of a generator for the atrium smoke removal fans. We could serve both loads from the same generator, but two automatic transfer switches would be required since one purpose is life safety (smoke removal system) while the lift station is a base requirement, and is not life-safety.
2. A generator with pad of approximately 12 ft. x 14 ft. surrounded by fencing will be required at the east end of the building.
3. Two pad-mounted transformers will be required to serve the facility. They will require a pad of approximately 16 ft. x 24 ft. If located within 10 m of the facility, a blast wall should be provide with three side of fencing for force protection.
4. Doyle told Carl the concrete-encased ductbank for power into the facility is approximately 2 ft x 2 ft.
5. The site drawing is C101 and is available on the FTP site.
6. There will be an irrigation system, and there will be a need for landscape and walkway lighting.

MEETING REGARDING THE LARGE AUDITORIUM, MARSHALL AUDITORIUM, AND OTHER SPACES (Andrew Kerr Grant (P&W), Shahrokh Azhdari (ABI), and Doyle Magnus (ABI):

1. The electrical room presently shown on A128 will move to the lower level by the mechanical room that serves the auditorium. The room on A128 will be needed by mechanical for a shaft. Doyle requested a 10 ft x 15 ft electrical room.
2. The ceiling in the large auditorium is planned to be exposed (painted black), with pendant sound baffles/reflectors.
3. Mechanical will utilize CO2 sensors to control the volume of air based on the number of occupants in the large auditorium.
4. Doyle requested a 6 ft x 8 ft electrical room, or a clear zone of about 22 linear feet for lighting and power panels near the stage of the large auditorium. The clear zone would need to avoid storage of materials and piping to a point about 4 ft. from the wall.
5. Doyle requested a space approximately 5 ft. x 6 ft. for an electrical room near the stage of Marshall Auditorium.
6. The Main Electrical room located at the east end of the first level will be relocated to avoid having a column in the middle of the room. The fire alarm control panel could go in this room. Double-doors will be located on one side, with another set of double-doors leading to the outside of the building from the Mechanical Room. A single door will be located on the other side of the room. Both doors of the Electrical Room will require to swing out and have panic hardware per NEC 110.26(C)(2).
7. The base does not require the electrical room to have an exterior door.
8. A motorized jib crane will be recommended a grid J/29 – Level 3, Sector 6 by the cooling towers.

MISCELLANEOUS POWER NOTES (5/13/02 and 5/14/02):

1. Rick Fernengel said that one model classroom will be built to finalize and verify the Classroom design.
2. Chris and Jeff are showing space for a dedicated power panel in their major communication rooms if needed.
3. Doyle/ABI will check codes to see if a second source of power can be used in lieu of a generator for the smoke removal system. Since two separate feeds serve the facility, this may be a possibility.
4. The fourth floor will require Red and Black Communication wiring. Only Black power is required on the fourth floor.
5. Chris and Jeff are including raceway, including surface-mounted raceway (Wiremold) in their costs, for communication systems.
6. All classrooms are to meet Classroom XXI requirements, even the three in the SCIF area on the 2nd Level, south end.
7. Col. Lynn Rolf will check to see if all of the SCIF Classrooms are to be designed for VTC.
8. According to Col. Rolf, the following rooms, conference rooms and auditoriums will have VTC:
    a. Large Auditorium
    b. Marshall Auditorium
    c. Main Conference Room (next to Marshall Aud.)
    d. Deputy Commandant Office (small version of VTC)
    e. Conference Room adjacent to Deputy Commandant Office
    f. Large Conference Room in the Admin. Wing on the 2nd Floor, Southwest
9. DDLC War Lab will have simulators in which the users will build a box within the space of a remote command post, for example. The room will be an open plan with industrial type fluorescent lighting. The room will have a higher electrical requirement than a typical office.
10. DDLC Command/Control Lab – Col. Rolf said we should contact Steve Davis for a summary of the electrical requirements for this space. It will be similar to the War Lab. There will be computers and simulators, and Sun Sparkstations.
11. The Document Center location was not identified on the plans.

C o m m u n i c a t i o n

To:	**File**	Date:	October 18, 2002
From:	Jeff Ziebarth	Comm. Type:	*Memorandum*
Distribution Copy:	Rick Fernengel Christine Hendzlik Ron Reid Michael Whitacre Dave Dimond	Project Name:	**Fort Leavenworth**
Regarding:	Square Footage Reduction	Project Number:	50905.004

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Everyone:

The following is a description of the square footage reductions we made to the building design as reviewed in Oklahoma City on April 25, 26.

First Floor Reductions

- Administrative Wing - North/South and East/West slices through the administrative wing of the building.
- Classroom Wing - East/West longitudinal slices (3) through the classroom wing.
- Great Hall Atrium – North/South and East/West slices through the Great Hall.

Second Floor Reductions

- Administrative Wing - North/South and East/West slices through the administrative wing of the building.
- Classroom Wing - East/West longitudinal slices (3) through the classroom wing.
- Great Hall Atrium – North/South slice through the Great Hall
- Auditorium – Substantial reduction in area of the back of house space in the auditorium.
- Classroom Wing Administrative Area – removed an east west area within the central module of the administrative area within the classroom wing.

Third Floor Reductions

- Administrative Wing - North/South and East/West slices through the administrative wing of the building.
- Classroom Wing - East/West longitudinal slices (3) through the classroom wing.
- Great Hall Atrium – North/South slice through the Great Hall
- Auditorium – Substantial reduction in area of the back of house space in the auditorium.
- Classroom Wing Administrative Area – removed an east west area within the central module of the administrative area within the classroom wing.
- Service/Support Area – Substantial reduction of area in the support spaces adjacent the classrooms northwest corner. These spaces were redistributed to leave only a mechanical room in this quadrant of the building.

C o m m u n i c a t i o n

Fourth Floor Reductions

- Administrative Wing - North/South and East/West slices through the administrative wing of the building.
- Classroom Wing - East/West longitudinal slices (3) through the classroom wing
- Great Hall Atrium – North/South slice through the Great Hall
- Classroom Wing Administrative Area – removed an east west area within the central module of the administrative area within the classroom wing.

We can provide with drawings showing the reductions as indicated.

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C o m m u n i c a t i o n

To:	**File**	Date:	October 18, 2002
From:	Jeff Ziebarth	Comm. Type:	*Memorandum*
Distribution Copy:	Rick Fernengel Christine Hendzlik Ron Reid Michael Whitacre Dave Dimond	Project Name:	**Fort Leavenworth**
Regarding:	Square Footage	Project Number:	50905.004

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Everyone:

This memo is to address the issues concerning the square footage of the current design on the Lewis and Clark Center. The current design represents a building size of 368,662 gross square feet (I'm using ft2 in lieu of m2). The original 1391 program document represented a building design guideline of 355,638 gross square feet.

The following is documentation of the difference in square footage growth as related to forces outside the control of the designers, the COE and the users at the Command & General Staff College – CGSC. We have grouped these into four different categories: Force Protection, Site Constraints, Technical Requirements, and Sustainability.

Force Protection Requirements:	2740 gross square feet	
	1800 gross square feet	
Total:	**4540 gross square feet**	

This number equates to added square footage accommodating additional lines of structural columns to allow for progressive collapse. This also includes the square footage needed to accommodate cross bracing structural elements within the building as related to progressive collapse and wind bracing for a four-story building. These two items equaled 2740 gsf. Also, we filled in the overhanging condition at the southeast corner of the classroom wing. This was done to eliminate an overhang condition requiring substantial structural elements and costs as related to force protection (blasts). This equaled 1800 gsf.

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Site Constraints: 3584 gross square feet
939 gross square feet
Total: 4523 gross square feet

This square footage equates to the square footage accommodating additional fire exiting stairs due to the height of the building. Stair sizes, location, and number within a building design is determined by the occupant count and distances between exits. The restricted available site for constructing this building required the building to be four stories in height, therefore the need for additional stairs. This equaled 3584 gsf. Also the toilet rooms were in the number of toilet rooms required as related to location on the floor and number of stories. The four-story building requires us to have four floors of evenly dispersed toilet rooms (two per floor) for eight toilet rooms total. If this was a two or three-story building we would have fewer toilet rooms of larger size. The 939 gsf represents the redundant circulation vestibules within the toilet rooms as related to this excess of toilet rooms.

Technical Requirements: Total: 1928 gross square feet

This square footage equates to adding technical support space for delivering the curriculum and functional support. This included the back of house (fly space) for the large auditorium and rear screen projection rooms for the main lecture hall and the main conference room. All of these spaces are required functionally and for the delivery of the curriculum.

Sustainability: Total: 503 gross square feet

This square footage equates to the added space for achieving the desired rating for sustainability. The loading dock contains an area of 215 square feet for the location of recycling bins as directly related to the adjacent compactor. The additional 288 square feet is for eight recycling collection areas throughout the building.

Total Square Footage Identified: 11,494 gross square feet

In summary we have identified growth areas within the building that could not have been anticipated by the documents assembled for the 1391 submission. The following is further comparison of square feet numbers associated with the current design.

Square Footage Allocations

1391 Program Report:	**355,638 gross square feet**
Current Design:	**368,662 gross square feet**
Square Footage Growth:	**13,024 gross square feet**
Percentage Change:	**3.7%**
Identified Square Footage Growth:	**11,494 gross square feet**
Difference unidentified:	**1,530 gross square feet**
Percentage:	**.4%**

We believe the following record to be an accurate summary of decisions and related discussions. We will appreciate notification of exceptions to this record within 10 (ten) days of its receipt. Failing such notification, we will consider this a statement of fact in which you concur.

PROJECT		WRITTEN BY
Command & General Staff College - Ft. Leavenworth, KS		Ronald J. Reid
PROJECT NUMBER	**FILE NUMBER**	**DATE WRITTEN**
100200800	30200800.01.20	May 28, 2002

Subject: Security Meeting
Date: May 21, 2002
Time: 1PM

A meeting was held in the offices of ABI to discuss the operation security requirements of the CGSC from the standpoints of Information/IT security and FP/Physical security.

Attendees:
Rick Fernengel, CGSC
Lynn Rolf, CGSC
Jon Moilanen, CGSC
Rich Heitkamp, CGSC
Ron Reid, ABI
Brian Dolan, ABI
Sean Graham, ABI

1. Access Control was discussed for the exterior and interior doors of the facility.
    a. Exterior doors and hardware were identified for controlled doors and exit only doors. The CARL and Eisenhower Hall need to be integrated into the security plan so that all access points to the CGSC can be controlled.
    b. Interior doors requiring card readers were identified to secure different portions of the building. Card readers are required on all classrooms and office suites to secure the property of the occupants. All telecommunications closets will have controlled doors. The system will be designed so that enhanced security can be implemented at higher threat levels by changing/activating doors to control access at the appropriate perimeters in the building.
2. The DLDC, 4th floor classrooms, and the SCIF areas will be processing classified information. DLDC and the 4th floor classrooms will only operate at the classified level on a periodic basis. This will require certain physical security features (DCID 1/21, TEMPEST/2-95, etc.) and will require the perimeters of these spaces to operate at their own security level, including an intrusion detection system. These requirements will be discussed in detail at the 06/07/02 security meeting.
    a. A PDS will be needed to connect the Red telecommunications closet(s) to these areas. The preferred approach is to expose the conduit to facilitate the daily inspections required by NSTSSI No. 7003.
    b. One Red closet will be located on the 4th floor in the office suite. Another may be added in the DLDC area. These closets are required to be secured and protected by and IDS. It is assumed they will operate at the classified level all of the time.
3. A CCTV system is required to monitor the exterior and interior of the building. CGSC staff indicated that they would prefer fixed cameras in lieu of pan-tilt-zoom cameras.
    a. The exterior perimeter will have 100% camera coverage and will include the entry plaza. Entry doors will have coverage to identify entrants to the building. CCTV coverage for the parking lots is desired.
    b. Preliminary interior coverage locations include the entry, the landings off the west stair tower, the 4th floor classroom area and other areas were laid out.
    c. A console will be installed at a security desk at the main entry and will serve as the main monitoring point for the CCTV system in the building. Monitoring off site will be discussed at the 06/07/02 security meeting.
4. Classified briefings will be held in the conference rooms, including the auditoriums. Amplified voice systems will require high STC ratings of walls and doors.
5. The command suite conference room and systems will be designed to accommodated classified video teleconferencing.

Subsequent to this meeting, floor plans were remarked with the access control, intrusion detection and CCTV camera locations as interpreted by ABI from the marked up meeting plans and discussions. These were overnighted to Mr. Fernengel and Mr. Dimond on May 23, 2002. These plans also noted the doors that were deleted and the doors that were added to meet the security needs. These marked up plans did not show access control on all the telecommunication closets and intrusion detection on the 4th floor, however, a follow-up email was sent which stated that this would be provided as noted in these meeting minutes above.

The security meeting to be held on June 7 at Ft. Leavenworth was finalized and a list of participants developed. Major Heitkamp sent out a message to that affect on 5/24/02.

Action Items:

1. CGSC personnel to review the marked-up drawings prior to the June 7 meeting so that any additional concerns or changes can be addressed at that time.
2. ABI will proceed with developing and pricing the construction estimate based on the meeting and will update the estimate with any additional information generated at the June 7 meeting.
3. P&W to revise the main entry and lobby to provide direct access to “speakers corridor” and to incorporate a two person guard station.

End of minutes.

We believe the following record to be an accurate summary of decisions and related discussions. We will appreciate notification of exceptions to this record within 10 (ten) days of its receipt. Failing such notification, we will consider this a statement of fact in which you concur.

PROJECT		WRITTEN BY
Ft. Leavenworth, Kansas - Command & General Staff College		Ron Reid
PROJECT NUMBER	**FILE NUMBER**	**DATE WRITTEN**
100200800	01.20	6/7/02

Subject: Force Protection and Security Criteria
Date: June 7, 2002
Time:

A security meeting was convened at Bell Hall on June 7, 2002, to discuss and finalize the force protection and security criteria for the 35% submittal of the CGSC facility.

Representatives of the following organizations were present:

The meeting was opened with introduction of those present and an overview of project and the agenda for the day. The group was divided into two work sessions with one group discussing IT/Systems technology and one group discussing force protection and building access control.

The force protection began by ABI representatives presenting the access control concept developed previously at a meeting in Oklahoma City. This concept is based on reducing the number of controlled entry points to two during higher Threatcons. These two entries are the main entry and the connection to the CARL. This reduction in the number of allowable entries is accomplished by software programming as all exterior doors have access control and intrusion detection systems.

It was pointed out, and agreed to, that the proposed system does not include mantraps or turnstiles and therefore cannot be considered a security system for classified scenarios. Security staff would be required to check ID's and access lists of each individual during higher threatcon levels. Areas that would be used for classified activities require either security staff to check each individual or devices such as mantraps to prevent tailgating into the area. It was acknowledged that present criteria and funding does not include square footage or equipment for classified levels of security or highest threatcon levels.

The basic concept of access control and intrusion detection was approved. This included:
1. Access control on all exterior doors.
2. Intrusion detection on all exterior doors.
3. Access control on doors leading to Administration Wing from main lobby.
4. Access control doors leading to Classroom wing from main lobby.
5. Access control doors leading to Classroom wing from AAFES areas.
6. Access control, IDS, and CCTV coverage of loading dock.
7. Complete coverage of building exterior (including entry points) by CCTV.
8. Access control on all doors to Telecom closets.
9. Guard station to be located in Main Lobby on level 2.

The User requested that the main entry be re-designed to increase the number of double doors and that the entry vestibule be pushed to the exterior of the current building lines. Also the main lobby needs to include a guard station in its design. The guard station should be designed as a raised reception counter to provide a clearer view of people entering the facility. It should include:
1. Space for a minimum of 4 CCTV monitors.
2. Area for PC operating access control system.
3. Storage for equipment racks and video equipment.
4. Means must be provided at guard station to secure monitors and equipment after duty hours.

Site force protection was discussed for both the original 25m standoff and the higher level 100m standoff. ABI discussed the manual crash gates that will be provided on Stimson road and the criteria which is to stop a 7000lb vehicle traveling at 40 mph. Decorative crash resistance fencing will be used in conjunction with these gates for some distance at which point post and cable systems will be employed for the greater distances. A sketch was presented by ABI of the post and cable system designed per criteria that is being used for estimating purposes.

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An 18 inch high reinforced wall will be used along the facility side of Stimson road and around plaza area to maintain the 25m standoff. A sketch was presented by ABI of the wall that has been designed per criteria and is being used in the estimate. This "seat wall" is being estimated with a brick facing and cast stone top for aesthetic purposes.

BWR explained that Stimson road was being designed in the manner that it is recessed about 24 inches along the south side of the facility for additional FP enhancement. There will be no shoulders or area for parking along the road. BWR presented a site plan illustrating the features of site force protection including gate, wall and post and cable locations. The plan included the new parking lot southeast of the building and the cul-de-sac on Went road at the existing housing area.

The plan indicated the wing arm crash gates are to be used at the entries and exits to the Director's parking lot and the auditorium service area. It is the intent to use aesthetically designed hydraulic bollards at the plaza entry and exit. These gates and bollards will be operated by the access control system.

It was pointed out by the government that the latest criteria does not allow the use of card swipes. Proximity systems must be utilized for access control.

The two working groups reconvened after lunch. Detailed discussions were conducted concerning the concepts and ramifications of equipping the 4th floor of the classrooms to operate in a classified mode. This discussion was expanded to include modifying all 4 classroom floors to operate classified. The result of discussions were:

1. Current design and program does not allow for corridor width necessary for man-traps plus egress doors.
2. The is not enough space between the elevators and classroom doors to place a mantrap or turnstile.
3. There is currently no space for RED closets on the individual classroom floors.

It was decided that there was not sufficient time to redesign the facility to indicate mantraps, doors and RED closets, etc before the estimate was to be submitted. Therefore, the basic building will be submitted as being BLACK and the estimate will simply have line items to indicate what additional square footage, and costs associated thereto, would be required to add the mantraps and RED closets, etc in order to run classified in either the 4th floor or all floors. Only the DLDC will be considered RED at the present time.

ABI will run a rough scenario on how much wider the classroom corridors would have to be in order to have a mantrap and a double egress door for BLACK operations. ABI will look at how much longer the building would have to be in order to put in the mantraps and RED closets. This additional square footage will be the basis for determining the additional line item cost for the estimate.

An item from the IT meeting is add single mode to the DC office from DOET.

Draft:

March 4, 2002

Ms. Judith Wimberg
Environmental Specialist
DIS Environmental Division
841 McClellan Avenue
Fort Leavenworth, KS 66027-1361

Re: Environmental Issues
Lewis & Clark Center
Fort Leavenworth, Ks
BWR Job No. 2002094

Dear Judy:

The purpose of this letter is to review some of the efforts that have taken place to identify the environmental concerns with the proposed construction of the Lewis & Clark Center and the accompanying 4th Street Extension.

The project is the construction of a 355,000 square foot, four story building that will be connected to the C.A.R.L. to the north and will extend to approximately Stimson Avenue to the south. The construction of this building will result in filling the existing creek about 150-feet beyond the end of the Smith Lake discharge pipe. This area was once a demolition landfill area.

The second part of the project is to build approximately 5,500 linear feet of four-lane roadway from Hwy 92 on the south to the Stimson Avenue and Wint Avenue intersection at the north end. The proposed roadway is along existing or abandoned roadbeds and will have three stream crossings. This area also contains two older demolition landfills.

We discussed the demolition landfills with the Fort Leavenworth Environmental Division Staff. There are two landfills in or close two the 4th Street Extension. Kansas Department of Health and Environment has been working with the Fort staff to obtain appropriate closure of these landfills. This project will need to delineate the landfill boundaries, and consider the closure and impacts of these landfills in the design of the roadway.

Mr. Chris Hayes, a biologist from the Kansas Department of Wildlife and Parks (KDWP) visited the site on Wednesday, February 20th to walk the site. Mr. Hayes was primarily concerned about the habitat for the Northern Redbelly Snake in the creek areas. After walking the site, Mr. Hayes said the areas below the dam appeared to be marginal habitat and areas near the 4th Street Extension may be somewhat better. First impressions were that minimum or no mitigation would be required but Mr. Hayes asked that Dr.'s Bill Busby or Joe Collins from University of Kansas and the Kansas Biological Survey be asked to visit the site. Mr. Hayes stated that KDWP would probably follow their recommendations. It is my understanding that Dr. Busby will visit the site in the near future, but he mentioned that there maybe too much activity around the dam areas for this to be a adequate habitat for the snake.

On Tuesday, February 26, Mr. James Scott, P.E. and Mr. Douglas Berka from the Regulatory Branch of the Kansas City District of the Corps of Engineers visited the site. They agreed that

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the area below the dam and the 4th Street Extension channel crossings are jurisdictional waters of the United States and 404 permit applications will be required. They believe that the area below the dam would qualify for a Nationwide 26 permit providing the fill is less then 300-feet from the end of the pipe. The 4th Street Extension channel crossings will require a Nationwide 14 permit. If the fill or construction extends into the flood plain areas parallel to the channels, wetland delineation will be required.

Biological improvement using native species, especially as woody growth understory, along the existing channels may suffice for mitigation requirements.

I understand that all comments and suggestions are subject to review and approval of permit applications and the final construction plans. However, this information does provide the design team with a sense of what to anticipate and a direction to proceed. If you have an understanding or clarification of what was said or the issues different from what I have described, or any other comments, please let me know.

Thank you for arranging the site visits and your input to the environmental concerns of this project. We are obviously both very interested in being sure that the environmental issues are identified early. I appreciate your assistance in accomplishing this.

Sincerely,
Bucher, Willis & Ratliff Corporation

Carl L. Johnson. P.E.
President, Environmental Division

Cc: Mr. Ron Reid, AIA Project Manger, Atkins-Benham
Ms. Christine Hendslik, Project Manger, USACOE
Mr. Chris Hayes, Kansas Department of Wildlife and Parks
Mr. Douglas Berka, Regulatory Project Manger, USACOE
Mr. James Scott, P.E., Regulatory Specialist, USACOE

BUCHER, WILLIS & RATLIFF
CORPORATION

MEMORANDUM

TO: Ron Reid, CGSC Team

FROM: Carl Johnson

SUBJECT: Dam Meeting, June 18, 2002

DATE: Wednesday, June 19, 2002 **Project # 2002-094**

Summary: The meeting was to inform Corps of Engineer Staff on the project and the implications of the dam, particularly as relates to dam safety. The meeting went well. A suggestion was made to relocate the dam downstream, close to the sewer and water crossing. This suggestion has merit because this dam would not be considered a "high hazard dam." This would create a small pool downstream as well as maintain the lakes upstream. ***This has implications to the Architects and Structural Engineers.***

On June 18, a meeting was held with staff from the Corps of Engineers to discuss the dam and its design.

Attendees included:

Christine M. Hendzlik	Project Manger, C of E, K.C
Leonard E. Bock	Ft. Leavenworth
Mike Wolf	Ft. Leavenworth, PWD
Raymond G. Dridge P. E	Dam Safety, C of E, K.C.
Frand Walberg	Dams/Hydrology, C of E, KC
Bill Zanner, P.E. (Briefly)	Chief of Eng. & Const., C of E. K.C.
Col. Curtis P.E., (Briefly)	Chief Eng. and 4th Dist. Commander, C of E, K.C.
Dale F. Munger	Dam Design, N.W Div., NW Division, C of E,
Al Swoboda	Hydrology/Hydraulics, N.W. Div. C of E,
Rich Marshal	C of E, Omaha
Donald Kareshige	C of E, NW Division

The meeting was held in Frontier Conference Center from 8:30 a.m. to 3:00 p.m. The meeting began with walk through of the site and the watershed. The group then adjourned to the FCC center of design and design criteria discussions.

1. There was general discussion of why the building is located at its present location.

2. Based on Discussions at the site the issues of greatest concern were:
   - Existing soil suitability and strength.
     We need the geotech report to accurately address the suitability and design constraints of the soil but it appears that large areas of the soil in the vicinity of the dam have very low blow count based on Ray Dridge's comments.

■7920 WARD PARKWAY, SUITE 100■KANSAS CITY, MO 64114 ■ (816) 363.2696 ■ FAX: (816) 363.0027 ■

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- Impacts downs stream. The concern is primarily for the existing sanitary sewer and water crossing and for the 4th Street extension. The water and sewer could be relocated, but an elevated crossing is needed unless a pump station is built. The impacts to 4th Street will be considered in the design of the street.
- Building location and construction methods. There were general questions as to the need for the building location on the dam, the elevation of the building, fill consolidation and seepage control. These were addressed and discussed.

3. Design Alternatives: Three viable alternatives for the dam were discussed:
   1.) Replace the dam at it present location on the upstream face of the building.
   2.) Construct a dam along the downstream face of the designed building fill.
   3.) Construct an independent dam downstream of the project so that the fill on which the building is built will have no dam function.

4. Design Criteria. The determination of the design criteria for each dam directly impacts the cost and viability of each alternative. A dam is classified high hazard if life is threatened.
   a. If the building is built on fill that is integral to the dam and dam failure would threatened the building so that dam failure could cause loss of life the dam is classified a High Hazard Dam and the dam would be designed according to High Hazard Dam criteria, must be able to accommodate the PMF (Probably Maximum Flood) and be designed with Corp Criteria.
   b. If the building is built on fill such that dam failure will cause significant economic loss – the same criteria would be followed.
   c. If the dam is not integral to the building fill, and not a threat to life or a significant economic threat, then the design would be according to the state of Kansas criteria, which needs to be able to pass the 0.4 pmp and follow SCS (NRCS) design criteria. (Because of the height of the damn, this would be still fall in the Kansas High Hazard criteria, but the criteria is less stringent that required for the other two alternatives.

5. BWR should analyze the 1.0 PMF without an emergency spillway to determine if it will force water into the building.

6. Design Alternative 1. Dam at the upstream face of the fill under the building. This is considered a High Risk dam and would require PMF flood control and design to Corps standards.

   Seepage, piping and erosion must be controlled downstream of the core of the dam. This would include a curtain wall placed to bedrock, and chimneys and

filter material below the dam core and directly under the building. Any disturbance to the filter material must control leakage so piping, seepage and erosion does not occur. The design of this leakage control is a major design concern.

A principal spillway (48" Diameter PCCP) would go the length of the fill with a 4-foot square intake structure located in the lake. The Principal spillway will be at the bottom of the lake (elev. 240.268 – 24 feet below the first floor elevation) and be approximately 115 meters long. The existing pipes through the fill will be removed.

An emergency spillway consisting of 4 -2.4 m x 1.2 m (8' x 4') square boxes would be situated at flow line elevation 243.16 (4.4 meters below the first floor elevation.) that would extend through the building and discharge east of the building. These will require access control and debris control grates over each end of the structure.

A flume and stilling basin would be required to control the emergency discharge. This will be a concrete structure with energy dissipation blocks and a stilling basin at the lower elevation.

The assumption is that the existing fill material will be removed and replaced with suitable material. *The geotechnical report needs to confirm the necessity for removal and replacement and the location of suitable fill material.*

7. Design Alternative 2. This alternative basically places the dam such that the dam is downstream of the building but part of the building fill. Since the building fill would still be integral to the dam, it would be considered a high hazard dam, the 1.0 PMF will be controlled and Corps dam design standards used.

   Alternative 2 requires the same principal spillway, emergency spillway, and removal of existing pipes as above. The Dam would be constructed to control seepage, piping and erosion to the same level as Alternative One.

   Alternative 2 would:

   - Not require the removal and replacement of the existing dam material except to the extent required to construct a new dam at the southern edge of the fill.
   - Would not require special designs for piers through the filtration material since this will be ouside of the building foot print.

8. Design Alternative 3. This alternative builds a complete new dam downstream of the proposed building with a totally independent structure. The dam would be designed to meet the Kansas dam design standards.

This alternative would place a dam east of the building with the crest at approximately 244 +/- 0.5 m, or 9 ½ meters below the first floor elevation. The dam would be an earth fill dam with a 20-foot wide top of dam and would maintain a permanent water pool east of the building. An open channel or buried culvert would connect the existing Smith Lake to the new pool under the building so that both side of the building would maintain the same lake water level (243.1 m).

The dam and emergency spillway would be designed for the 0.4 PMF (19 cms or 670 cfs) versus 1 PMF (47 cms or 1,660 cfs) for the other two alternatives. The emergency spillway would be located on undisturbed earth south of the dam.

The principal spillway would be a 48-inch diameter PCCP approximately 90 to 95 meters long discharging into the existing channel.

A 404- permit will be required.

Seepage control will also be required in the proposed dam, but probably not include a curtain wall.

The dam could be constructed and compacted independently of the building construction. Failure of the dam would impact the 4th Street roadway only, not the building or other structures. It may not be cost effective to protect the 4th Street crossing in the event of a 0.4 PMF (500-year storm?) dam failure

The water and sewer crossing will be replaced, potentially with the water and sewer being integral to the dam.

BWR will be estimating quantities so a cost comparison of the alternatives can be completed. A preliminary evaluation suggests that Alternative 3 will be much more constructable, have fewer hazards, and be less expensive.

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